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Joint intelligence operations centers (JIOC) business process model & capabilities evaluation methodology

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JOINT INTELLIGENCE OPERATIONS CENTERS (JIOC) BASELINE BUSINESS PROCESS MODEL
&
CAPABILITIES EVALUATION METHODOLOGY

by

Gordon Schacher, Nelson Irvine and Roger B. Hoyt

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A JIOC Business Process Model has been developed for use in evaluating JIOC capabilities. The model is described and depicted through OV5 and organization swim-lane diagrams. Individual intelligence activities diagrams are included. A JIOC evaluation methodology is described

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Acronym List

AESG	Architecture Engineering Support Group
AHC	Ad-Hoc Collection
AOR	Area of Responsibility
AT/FP	Anti-Terrorism/Force Protection
BDA	Battle Damage Assessment
BPM	Business Process Model
CIA	Central Intelligence Agency
CoA	Course of Action
COCOM	Combatant Command
COP	Common Operating Picture
CR	Collection Request
CT	Counter Terrorism
DIAP	Defense Intelligence Assessment Protocol
DNI	Director of National Intelligence
DODAF	Department Of Defense Architecture Framework
EEI	Essential Elements of Information
EW	Electronic Warfare
FBI	Federal Bureau of Investigation
FDO	Foreign Disclosure Office
FIRE	Fleet Innovation and Research Enterprise
FLTREP	Flight Report
GCCS	Ground Common Control Station
GEOINT	Geospatial Intelligence
G-I	Geospatial Intelligence
HA/DR	Humanitarian Assistance/Disaster Relief
HUMINT	Human Intelligence
IC	Intelligence Community
ICD	Initial Capabilities Document
I & W	Indications and Warnings
INTELINK	Intelligence Link
IO	Information Operations
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
JCIDS	Joint Capabilities Integration and Development System
JCMB	Joint Collection Management Board
JCS	Joint Chiefs of Staff
JCWG	Joint Collection Working Group
JIPCL	Joint Intelligence Priority Collection List
JIOC	Joint Intelligence Operations Centers
JOC	Joint Operations Center
Joint Staff (JS) J262	Director, Enterprise Integration & Info Sharing
JSBA	Joint Intelligence Interoperability Board System Baseline Assessment
JTF	Joint Task Force
MASINT	Measures and Signature Intelligence

M-I	Multi-Intelligence
MIB	Morning Intelligence Brief
MIDB	Modern Integrated Database
MISREP	Mission Report
MN	Multinational
NCA	National Command Authority
NGA	National Geospatial-Intelligence Agency
NGO	Non-Governmental Organizations
NPS	Naval Postgraduate School
NTRB	National Targeting Review Board
OPLAN	Operations Plan
OPORD	Operations Order
OPSIT	Operational Situation
OSINT	Open Source Intelligence
OV	Operational View
PED	Processing, Exploitation, and Dissemination
PIR	Priority Information Requirements
POI	Person of Interest
PR	Production Requests
ROMO	Range of Military Operations
RSC	Regional Service Center
RFI	Request for Information
SA	Situation Awareness
SIA	Senior Intelligence Analyst
SIGINT	Signals Intelligence
SME	Subject Matter Expert
SU	Situation Understanding
TST	Time Sensitive Targeting
USD(I)	Under Secretary of Defense for Intelligence
VOI	Vessel of Interest

1.0 INTRODUCTION

Joint Intelligence Operations Centers (JIOC) are "the primary intelligence organizations providing support to joint forces at the operational and tactical levels. The JIOC integrates the capabilities of Director of National Intelligence (DNI) Service, combat support agency, and combatant command intelligence assets to coordinate intelligence planning, collection management, analysis, and support" (JP 2-0).

The JIOC objective is to direct and provide 24/7 intelligence support to theater forces and national customers. This support includes:

- All source political/military intelligence
- Theater situational awareness
- Support to counterterrorism operations
- Targeting support
- Management of theater collection requirements and collection sensors

Significant support is also provided to intelligence campaign planning, and theater engagement requirements.

The JIOC Information Technology (IT) Enterprise for 2010-2015 Initial Capabilities Document (ICD) envisions a network-centric, all-source Intelligence, Surveillance, and Reconnaissance (ISR) capability that enables data discovery, collaboration, and shared services among Combatant Commands (COCOMs), Military Services, Combat Support Agencies (CSA), the Intelligence Community (IC), and Multinational (MN) partners. The JIOC IT Enterprise will support COCOMs throughout the Range of Military Operations (ROMO) from the tactical to strategic levels. JIOC Enterprise IT requirements are specifically focused on enabling JIOCs to support COCOMs and their subordinates.

The Under Secretary of Defense for Intelligence (USD(I)) established a governance structure to address COCOM JIOC information sharing needs. It oversees the design, implementation, sustainment, and future improvement of the JIOC information sharing enterprise to support the COCOMs as outlined in the April 2006 JIOC Execute Order. The JIOC information sharing enterprise includes a combination of technology, policies, capabilities, processes, and data standards needed to provide interoperable, net-centric intelligence, surveillance, and reconnaissance (ISR) capabilities for joint and coalition forces.

Understanding current JIOC interoperability and capability issues that affect the conduct of joint operations - technical and process – is critical for the successful planning and eventual transition to the next generation JIOC enterprise. The purpose of this JIOC BPM study is to provide an operational-level analysis/assessment that will be used as a baseline in support of subsequent JIOC Governance Board enterprise planning, organization improvement, and investment strategy decisions.

USD(I) and the Director, Enterprise Integration & Info Sharing (Joint Staff (JS) J262) tasked the Naval Postgraduate School (NPS) to research JIOC enterprise operations and construct a baseline Business Process Model (BPM). The model will document JIOC organization structure, activities, and information flow. The tasks to be accomplished in the project are:

- Construct a baseline JIOC BPM.
- Determine the organizations and procedures used by COCOMs to implement their JIOCs.
- Construct a COCOM-specific BPM.
- Develop a methodologies for:
    - identifying differences in COCOM JIOC implementation strategies
    - associate gaps with, activities in the BPM architecture
    - identifying system and process interoperability issues within and between JIOCs

Phases of the project are intended to support the JIOC Information Sharing Enterprise Board efforts to:

- Oversee the design, implementation, sustainment and future improvement of the JIOC information sharing enterprise
- Implement a JIOC governance process that drives national-to-tactical intelligence sharing and interoperability capabilities

NPS past support to Joint Staff J2 for Joint Intelligence Interoperability Board System Baseline Assessment (JSBA) interoperability studies will be extended to:

- Provide support and develop a means to assess JIOC implementation progress
- Support JIOC architecture team development efforts
- Support the Defense Intelligence Agency (DIA) Architecture Engineering Working Group and the Enterprise Architecture Working Group

The methodologies for developing COCOM JIOC BPMs and subsequent evaluation of JIOC capabilities are reported here.

2.0 MODELING JIOC OPERATIONS

2.1 Business Process Model Description

Business Processes Models (BPM) focus on how specific business activities are performed, here military intelligence activities. The components of this model are JIOC activities and associated activities with which they share information. The model includes:

- Information products that are used/produced by activity tasks
- Organizations/people that perform the activities/tasks
- Resources that are used to perform the tasks
- Procedures that are followed to perform the activities (Concept of Operations (CONOPS), Tactics, Techniques, and Procedures (TTP), Standard Operating Procedure (SOP))

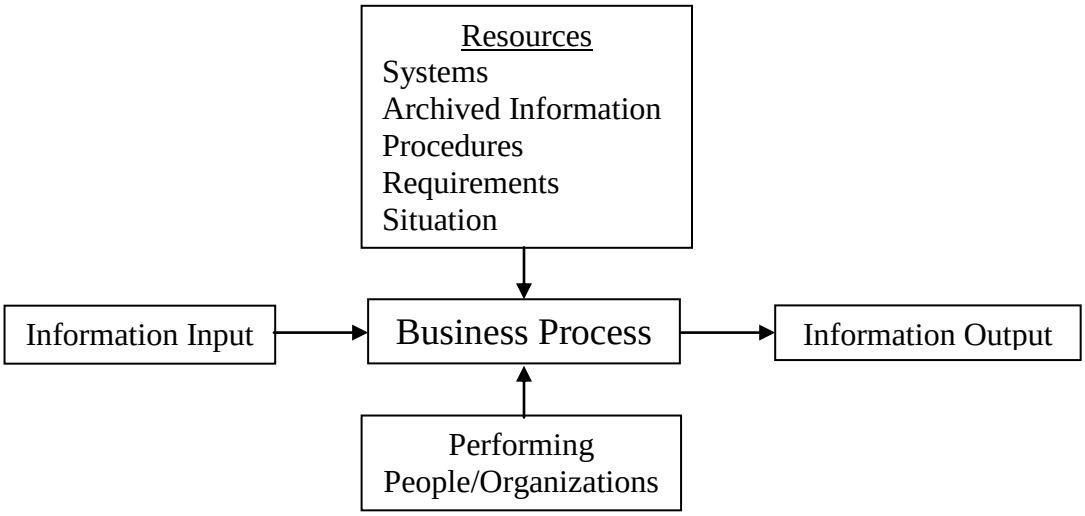


Figure 2.1 Business Process Model Components

Figure 2.1 illustrates the essential components of a BPM that models a process where information is the primary product. The process modeled may be that of a whole organization or one or many components of the organization. I.e., the processes modeled can be at any level, from the lowest level such as typing a single letter to the complete process of a publishing organization. The level at which the model is developed depends on the results one wishes to produce from the model.

Figure 2.1 shows a single process. A BPM will normally contain a set of connected activities and tasks that make up the total process of interest. Section 3 describes activities and tasks that are included in the JIOC baseline BPM. The JIOC baseline BPM described here does not include systems.

JIOCs provide intelligence information for military activities. The activities and tasks included in the model are those needed to provide this information. Following is an example of activities and tasks performed to support a specific military operation:

Operation – Ship Entering a Port
- JIOC Operation – Support Port Visit with relevant intelligence
  - Activity 1 – Determine Information Needs
    - Task 1.1 – determine local situation
    - Task 1.2 – determine ship capabilities
  - Activity 2 – Determine Collection Requirements
    - Task 2.1 – determine information already available
    - Task 2.2 – request collection
  - Activity 3 – Task Collection Activities
    - Task 3.1 – determine collection capabilities
    - Task 3.2 – correlate requirements with capabilities
    - Task 3.3 – forward collection requests
  - Activity 4* – Collect Information (not a JIOC activity)
    - Task 4.1 – assign assets
    - Task 4.2 – execute collection
    - Task 4.3 – forward collected information
  - Activity 5 – Assess Information
    - Task 5.1 – correlate information with situation
    - Task 5.2 – develop threat assessment
  - Activity 6 – Provide Threat Assessment
    - Task 6.1 – disseminate threat assessment

*Note that Activity 4 is not performed by a JIOC but by some other organization. It is included in the activity list because it is an important part of supporting the ship operation and is needed in the BPM to have information inputs and outputs for JIOC activities. Other organizations are included in the BPM if they are needed to provide complete JIOC information flow.

The above is only an illustration of a set of activities the tasks needed to carry out the activities. It does not show all of the activities and tasks needed to support the operation. The JIOC BPM includes all activities and tasks needed to carry out JIOC operations.

It is important to recognize that there is no one, or right, way to segment an organization's activities into an activity/task structure. What one does is develop a structure that is appropriate for what is to be studied or learned. For the JIOC Baseline BPM shown in this report the overarching structure is the intelligence activities contained in Joint Publication 2.0 (JP-2.0). The structure under these activities has been developed to insure completeness and effectiveness for evaluating JIOC capabilities.

2.2 BPM Depictions

A process model is a depiction of processes, resources, products, and the "actors" (people and organizations) involved in executing the processes. Large organization processes are complex (a

JIOC is certainly complex) and some sort of visualization/depiction is needed for understanding processes structure, and hence the model. We use three depictions here:

1. Department of Defense Architecture Framework, Operational View (OV-5) (Section 4)
2. Swim-lane activity diagrams (Section 5)
3. Intelligence processes operational threads (Section 6)

Number three provides diagrams needed by the Architecture Engineering Support Group (AESG) requirement to produce operational threads for the JIOC functional CONOPS.

Depiction 1, the OV-5: This activity and task hierarchy structure is built on the six intelligence process activities defined in JP 2-0. For our structure we name these "Principal Activities". They are:

- Planning and Direction
- Collection
- Processing and Exploitation
- Analysis and Production
- Dissemination and Integration
- Evaluation and Feedback

The JIOC Operational Order (OPORD) directs a change in emphasis in intelligence operations with its stress on the purpose of intelligence being to support operations. Because of this we have added a seventh Principal Activity to our BPM structure.

- Intelligence Support to Operations

The BPM structure is as follows:

Principal Activity
- Activity-1
  - Task-1.1
  - Task-1.2
  - etc.
- Activity-2
  - Task-2.1
  - Task-2.2
  - Task-2.3
  - etc.
- etc. for all 7 Principal Activities

There are sub-tasks, resulting in a 4-level structure (see the OV5 diagrams in Section 4). Input information is needed for task performance, and tasks produce information that is consumed by other tasks.

The specific activity structure used here is in conformance with the Joint Pubs and with the OPORD, but not defined by those documents. The documents leave a fair amount of room for interpretation. For example, collection planning in the Joint Pubs is shown under both "Planning and Direction" and under "Collection". In all cases where there is lack of definition we have constructed the activity structure so as to be most efficient for BPM construction. We have constructed a conforming and sufficient structure, not an only-possible or necessarily best structure.

Depiction 2, Swim-Lane Diagrams: A swim-lane is a visualization diagram that shows the organizations that performs JIOC tasks at the head of a lane and the tasks it performs as labeled boxes in its lane. The box labels identify the tasks and also specify the information produced by that task. Arrows between the activity boxes show the sequence of tasks. This depiction contains:

- Processes (activities and tasks) that are executed
- Activity/task sequence
- Information produced and exchanged
- Performing organizations

The OV-5 and swim-lane depiction use the same color code for the activity/task structure. The swim-lane diagrams and a complete description of the presentation are given in Section 5.

Time flows roughly left to right in the swim-lane diagrams. However, one cannot infer that a task block that is to the right of another must occur later in time. One can infer task sequencing from the arrows that connect the tasks.

Depiction 3, Basic Intelligence Threads: An Thread is a portion of the BPM that is readily identified as a well-defined JIOC activity that contains a number of tasks, such as Collection Management. Such thread groupings are identified by a particular color code, and all of its tasks have that color code. The color codes will be explained in Section 4.

The AESG is in the process of producing Operations Threads for the JIOC Functional CONOPS, with 40 threads planned. The threads the AESG is developing conform closely to segments of the JIOC baseline BPM. For this third depiction we have segmented the BPM into those portions that produce threads in order to satisfy AESG requirements. 25 threads have been produced and are shown in Section 6.

2.3 BPM Employment

A BPM is developed to map and understand a complex set of interrelated processes. Following are very brief descriptions of potential uses for the JIOC baseline BPM to meet JS J2 and DIA needs. Results of such studies are not reported here.

2.3.1 Assessing JIOC Capabilities

JIOCs are relatively new intelligence operations organizations that are being implemented across the DoD. Because of mission differences and other factors, implementation is not the same at all commands. The Baseline BPM contains the full set of activities and tasks that are to be accomplished by all JIOCs. Comparing individual JIOC operations to the established activities and tasks can be used to determine if those tasks are performed and how well. How well they are performed is not in itself a sufficient evaluation. Comparison must be made to an established capability threshold. Such thresholds can be defined through documents such us Initial Operational Capability (IOC) and Full Operational Capability (FOC). IOC and FOC specifications are coarser grained than the tasks in the BPM. Thus, additional thresholds at the task level need to be defined for a detailed assessment of JIOC capabilities.

2.3.2 Comparing JIOC Capabilities

Differences in capabilities of the JIOCs at different commands are to be expected if for no other reason than differences in resources (possible reasons for differences are not discussed here). The baseline BPM provides a means to identify differences in implementation and effectiveness at the activity and task level. This can be done by comparing both JIOCs to the thresholds noted above or by comparing task capabilities directly. Another outcome of such comparisons is to determine cause-and effect for capabilities variations, and to propose corrections.

2.3.3 CONOPS, SOP, and TTP

There is a direct relationship between a BPM and associated CONOPS, SOP, and TTP. The BPM maps out the activities and tasks that are described in the guidance documents, making explicit the sequence of activities and how they are implemented. Comparison of a specific JIOC's BPM to the guidance documents for conformance can reveal deficiencies in procedures (or deficiencies in the documents). As an example, in Pacific Command (PACOM), the Joint Collection Working Group is attended by all J-Codes. This is a specific concept for collection management that is not in current CONOPS.

2.3.4 Experiment/Test Development

We address here operational capabilities testing, not system capabilities tests. Testing operational capabilities requires that a sequence of operational activities be executed. One has to insure that the activities executed will produce results that address the question being asked. There are a number of question types that can be addressed. E.g., does use of a particular system improve operations, are personnel sufficiently trained, are the procedures effective, etc.? In all cases an operational activity, or sequence of activities, has to be executed in order to produce a valid test. The BPM architecture is used to identify the appropriate activities.

2.3.5 Understanding Gaps

Deficiencies in operational capabilities are commonly referred to as gaps. Gaps come in many flavors: systems, personnel, procedures, etc. Identifying a gap is fairly straightforward. Identifying solutions, essentially cause-and-effect is not easy; doing so is aided by using the BPM. The BPM provides a direct correlation between an operational activity, or sequence of activities, and the identified operational capabilities gap.

2.3.6 Joint Capabilities Integration and Development System (JCIDS)

JCIDS is the methodology used by DoD for procurement decisions. A step in the methodology is to provide an architecture visualization as part of requirement validation and also to demonstrate that the solution proposed has potential for success. Using a BPM architecture to illustrate how a system would support an activity and address a particular shortfall is an efficient means for providing validation of the procurement proposal.

2.3.7 Status Determination and Visualization

The ultimate interest in using the BPM is to assess operational capabilities. Capabilities are the result of the ability to perform many interrelated tasks. When determining operational capabilities status one wishes to determine cause-and-effect, which involves determining the contribution (positive and negative) of the many tasks involved in the process. With so many tasks an efficient means is needed to sort through the effects. Reporting status through an architecture-visualization is one of the best ways to do this. Pointing and clicking on activities and tasks in either the OV-5 or the swim-lane presentation can provide the visual access to underlying status information. All of the needed status information can be archived, accessed, and visualized through the architecture. A preliminary design for this capability has been formulated and is presented in the PACOM JIOC BPM report. Status information would be contained in a database and is accessed by links in the architecture boxes. Changing the information in the database automatically updates the status information that is accessed. This full construct can be implemented in the Naval Postgraduate School (NPS) Fleet Innovation and Research Enterprise (FIRE) knowledge management system.

2.3.8 Simulation

A simulation is an executable model that is based directly on the model architecture. It is created by setting up a means to time step through a sequence of tasks. Simulation development requires establishing parameters for the task blocks and a rule set for how activity performance depends on the parameters. Simulation results are produced by time stepping through the activities to determine overall performance. The key to developing a valid simulation is providing parameters and rules that realistically represent operational performance. The number of rules and parameters can become very large. This topic is not addressed further in this report except to note that the BPM is the underlying model for JIOC performance simulation.

3.0 BASELINE JIOC GENERIC ORGANIZATIONS

The BPM presented here is a baseline, designed to be applicable across all JIOCs. All JIOCs are required to perform the same activities, those defined by Joint Pubs 2. Because JIOCs are organized differently, depending on resources and the desires of the COCOM Commander, it is necessary to use generic organizations in the baseline as the activity performing entities. The BPM for a specific JIOC will be derived from the baseline by replacing generic organizations with its specific ones.

COCOM activities are managed by the J-codes, J2, J3, J4, J5, and J6. This project is mainly concerned with J2 and J3 activities and those organizations are represented in the model. Coordination activities across the J-codes are identified as being done by coordination boards with generic titles (or real titles where appropriate such as the Joint Collection Management Board (JCMB)).

COCOMs interact with many national-level organizations and agencies. These are lumped together into two generic organizations, one for command/oversight activities and one for analysis activities.

The following are the generic organizations arranged in their command hierarchy. Explanations of the function of each follow the list.

- National Command and Agencies
  - Agency Analysts
- COCOM Commander
  - J-Code Boards
  - J2
    - Intelligence Management
    - Production Management
    - JIOC Watch
    - Red Team
    - Intelligence Specialists
    - Intelligence Analysis
    - Intelligence Archives
  - J3
    - Joint Operations Center (JOC)
- Systems Management
- Collection Management
  - Collection Assets
- Component Command
  - Component Analysis
- Coalition Command
  - Coalition Analysis

National Command and Agencies – National command organizations that set intelligence priorities/guidance, e.g., Joint Chiefs, National Command Authority (NCA); National agencies that specify their intelligence requirements, e.g., Central Intelligence Agency (CIA), National Geospatial-Intelligence Agency (NGA), Federal Bureau of Investigation (FBI).

Agency Analysts – analysts within the agencies that produce intelligence products and collaborate with COCOM JIOC analysts.

COCOM Commander – the Commander and his/her staff, for the purpose of setting COCOM requirements and guidance.

Cross-Code Collaboration Boards – coordination/management boards that function across the J-codes, e.g., JCMB.

J2, J3 – COCOM intelligence and operations command organizations.

Joint Operations Center (JOC) – monitoring and controlling intelligence collection and assessment operations.

Organizations Under J2:
Intelligence Management – all intelligence management positions under J2, any position that assigns and monitors intelligence tasks, e.g., Senior Intelligence Analyst (SIA), Division and/or Branch managers.

Production Management – specific organization that manages intelligence production, that coordinates with national production procedures in accord with Defense Intelligence Assessment Protocol (DIAP).

JIOC Watch – continuous monitoring of intelligence activities within the COCOM and coordination of intelligence operations with outside organizations.

Red Team – organization assigned independent red assessments, and to propose alternate analyses of red intent and Course of Action (CoA).

Intelligence Specialists – specialists in specific intelligence areas, e.g., air, land, cyber; intelligence type specialists, e.g., Geospatial Intelligence (GEOINT), Measures and Signature Intelligence (MASINT).

Intelligence Analysis – organizations responsible for intelligence analysis, assessment, and product dissemination.

Intelligence Archives – any permanent archive of intelligence information, e.g., Modern Integrated Database (MIDB).

Collection Management – organizations that manage collection requirements and tasking, e.g. Collection Cell, Joint Collection Working Group (JCWG), collection managers within Divisions and Branches.

Collection Assets – organizations that assign, operate, and control collection assets of all type, including system and human. Collection assets are both within and outside the COCOM.

Systems Management – that portion of J6 and the Regional Service Center (RSC) that provides intelligence and Common Operational Picture (COP) systems support, primarily Global Command and Control System (GCCS) and Distributed Common Ground Station (DCGS).

Organizations outside of the COCOM:
Component Command – command portion of the components that belong to the COCOM.

Component Analysis – analysis functions within COCOM components.

Coalition Command – foreign coalition partner commands, Non-Governmental Organizations (NGO) may be included.

Coalition Analysis – analysis functions within coalition partners, also possibly NGOs.

4.0 BASELINE JIOC OV-5

The basic six intelligence activities from JP-2.0 and one from the JIOC Execute Order (EXORD) were introduced in Section 2. Figure 4.1 presents the activity structure p[resented in a DODAF OV-5 diagram.

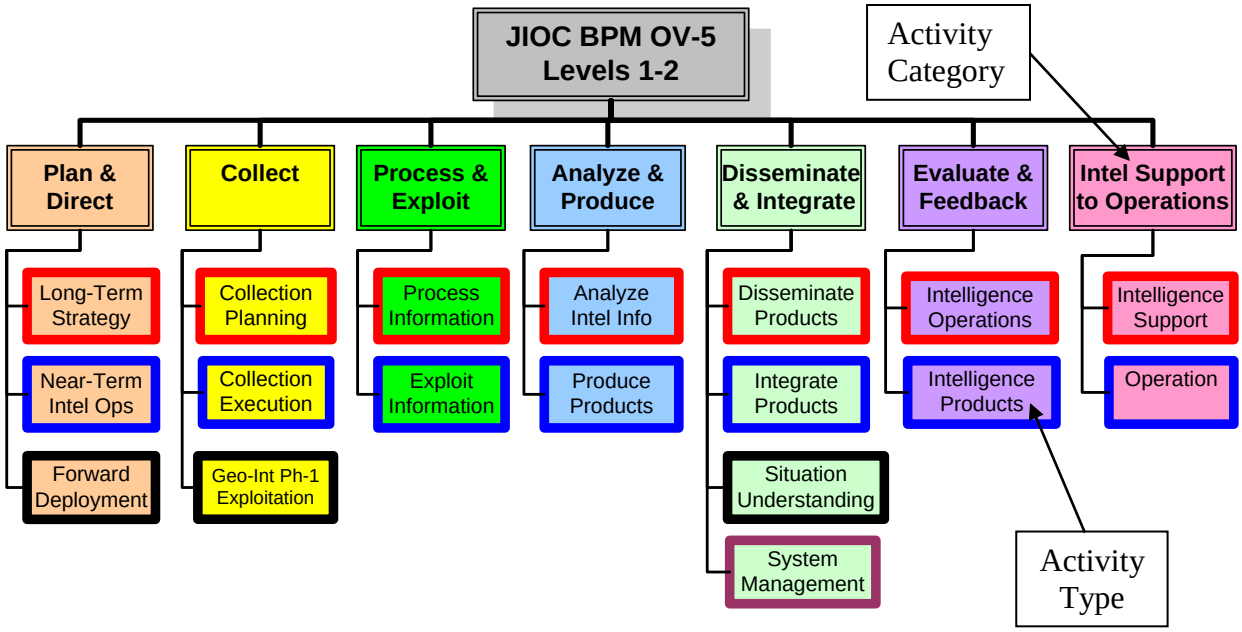


Figure 4.1 OV5 diagram of JIOC baseline activity structure (top two levels)

The top two levels of the activity structure are shown in the figure. There are two more levels (task levels). The OV-5 diagrams that include these lower levels follow.

The above color scheme is used to readily identify activities. The interior box color indicates the Activity Category and the outline color the Activity Type. Tasks types within each activity are indicated by solid or dashed/dotted borders, as is seen in the following figures. This color scheme is also used in the swim-lane diagrams.

Figure 4.2 shows the activity structure OV-5 for the top three levels. Figures 4.3 through 4.9 include the structure for level four, the lowest task level.

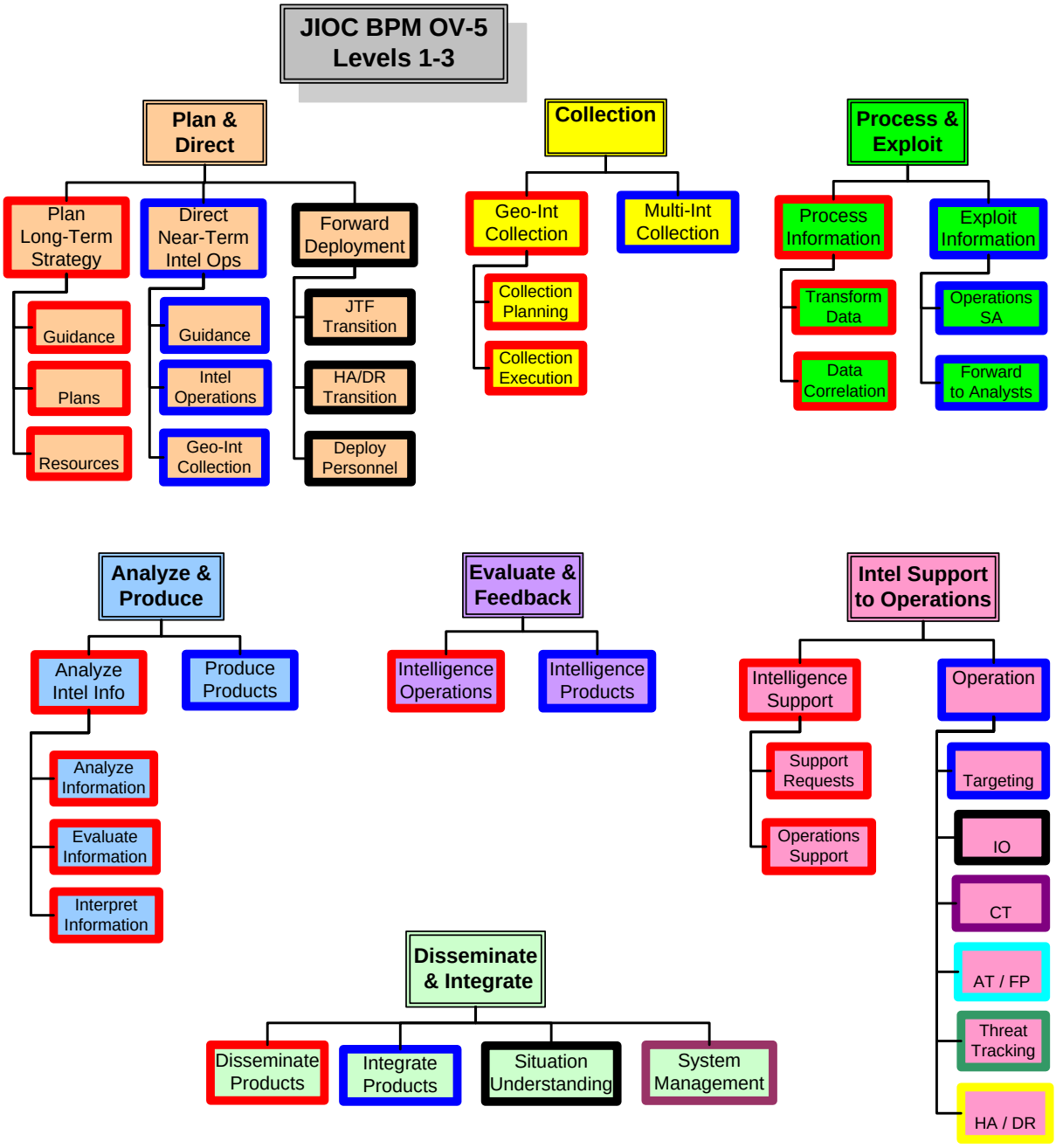


Figure 4.2 OV5 diagram of JIOC baseline activity structure (top three levels)

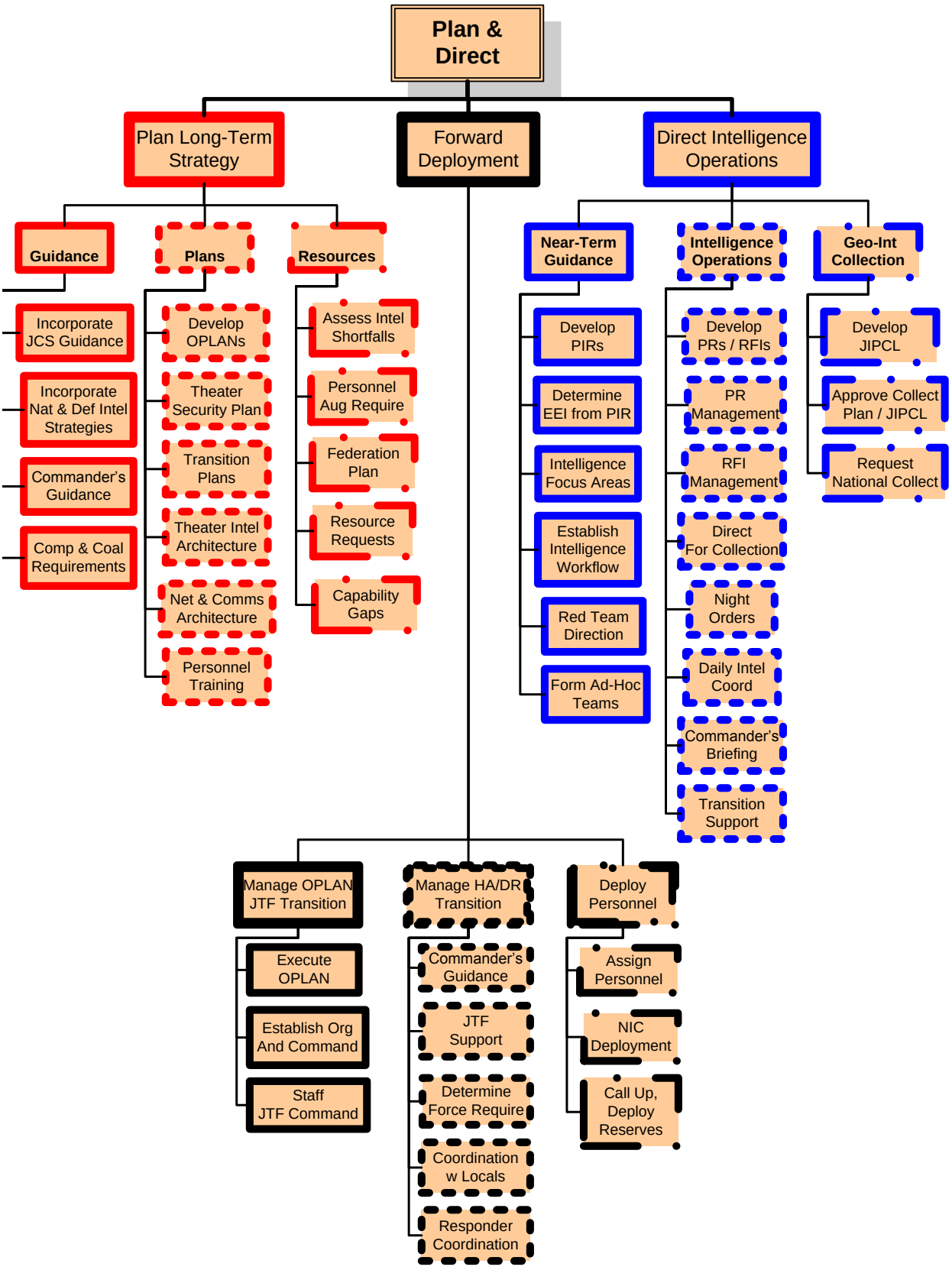


Figure 4.3 OV5 diagram of activity structure for the Plan and Direct activity

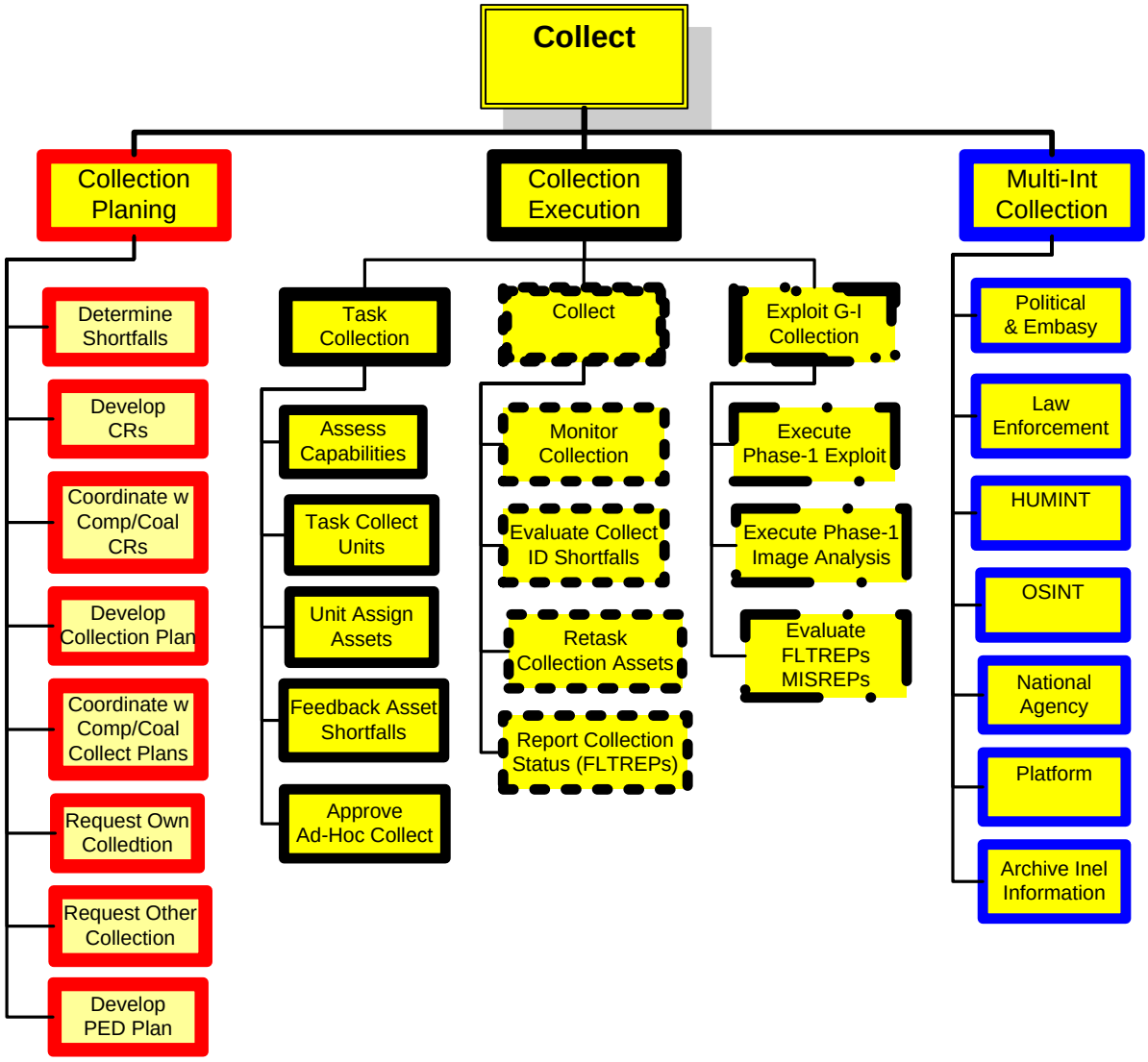


Figure 4.4 OV5 diagram of activity structure for the Collect activity

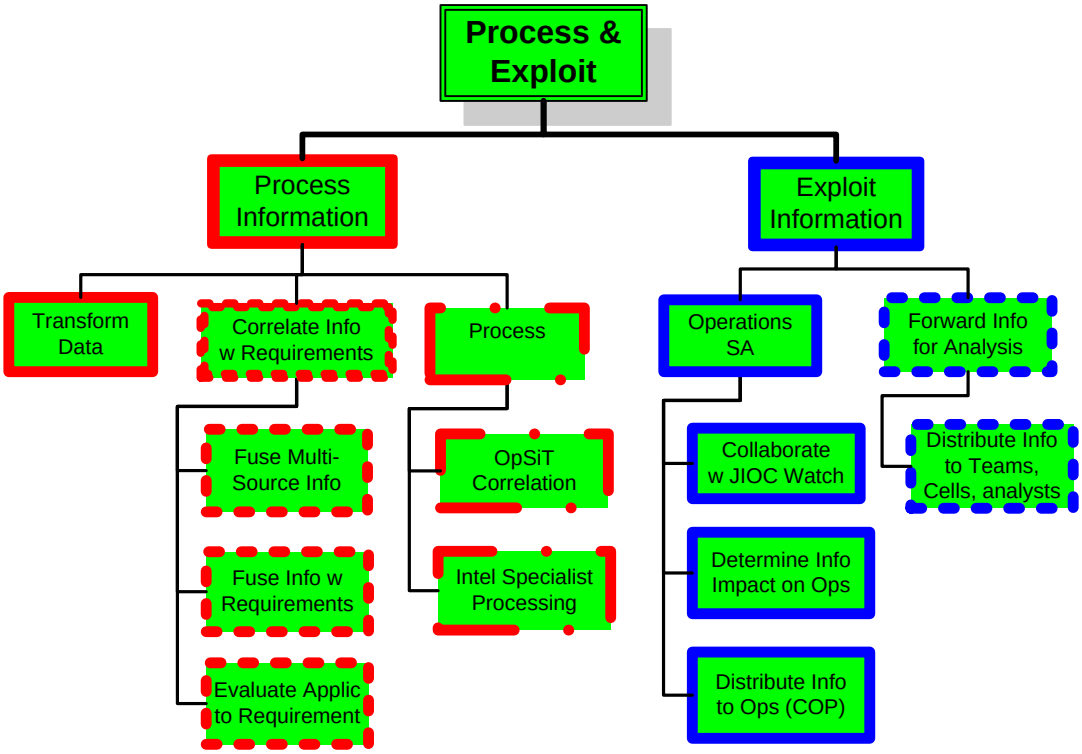


Figure 4.5 OV5 diagram of activity structure for the Process and Exploit activity

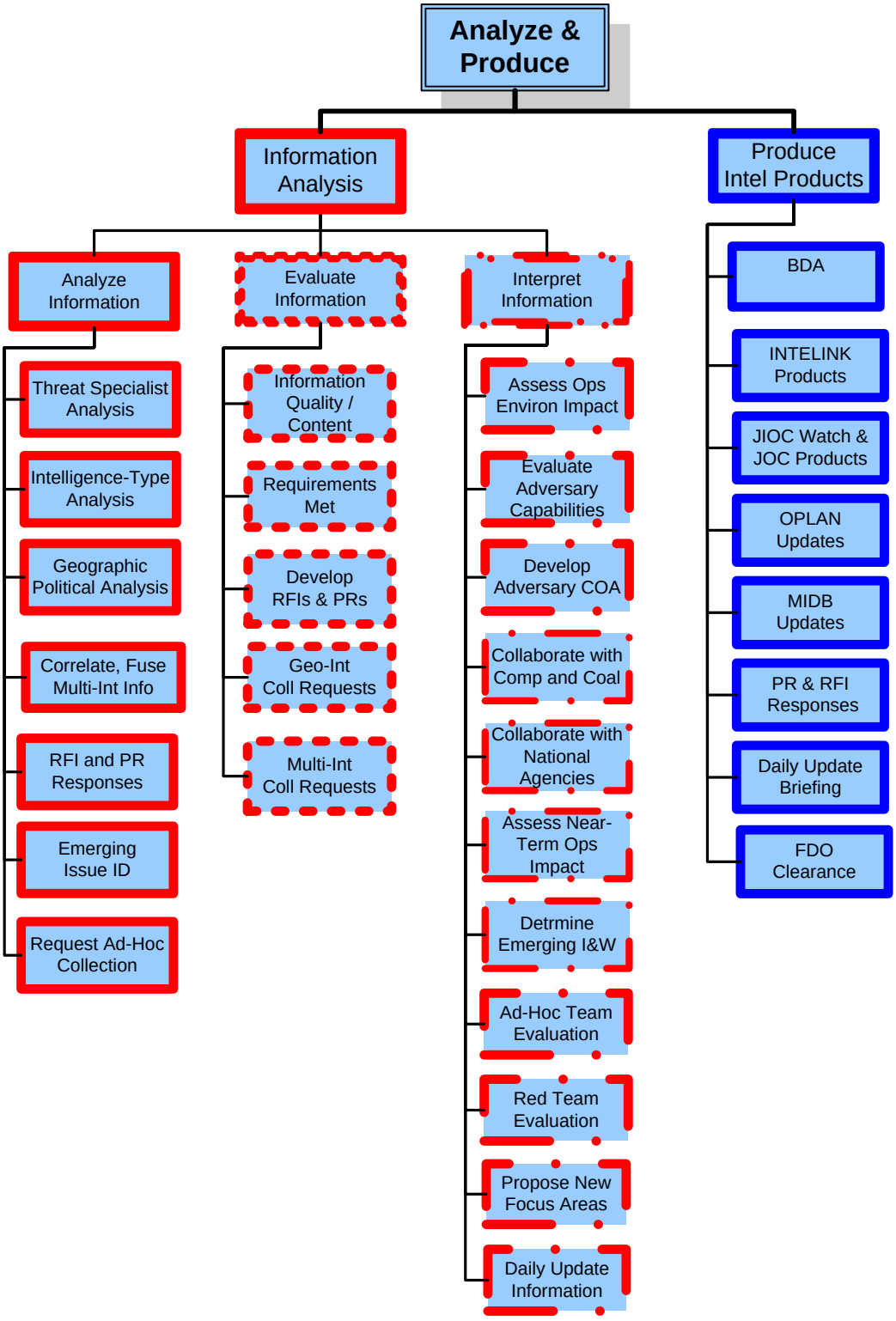


Figure 4.6 OV5 diagram of activity structure for the Analyze and Produce activity

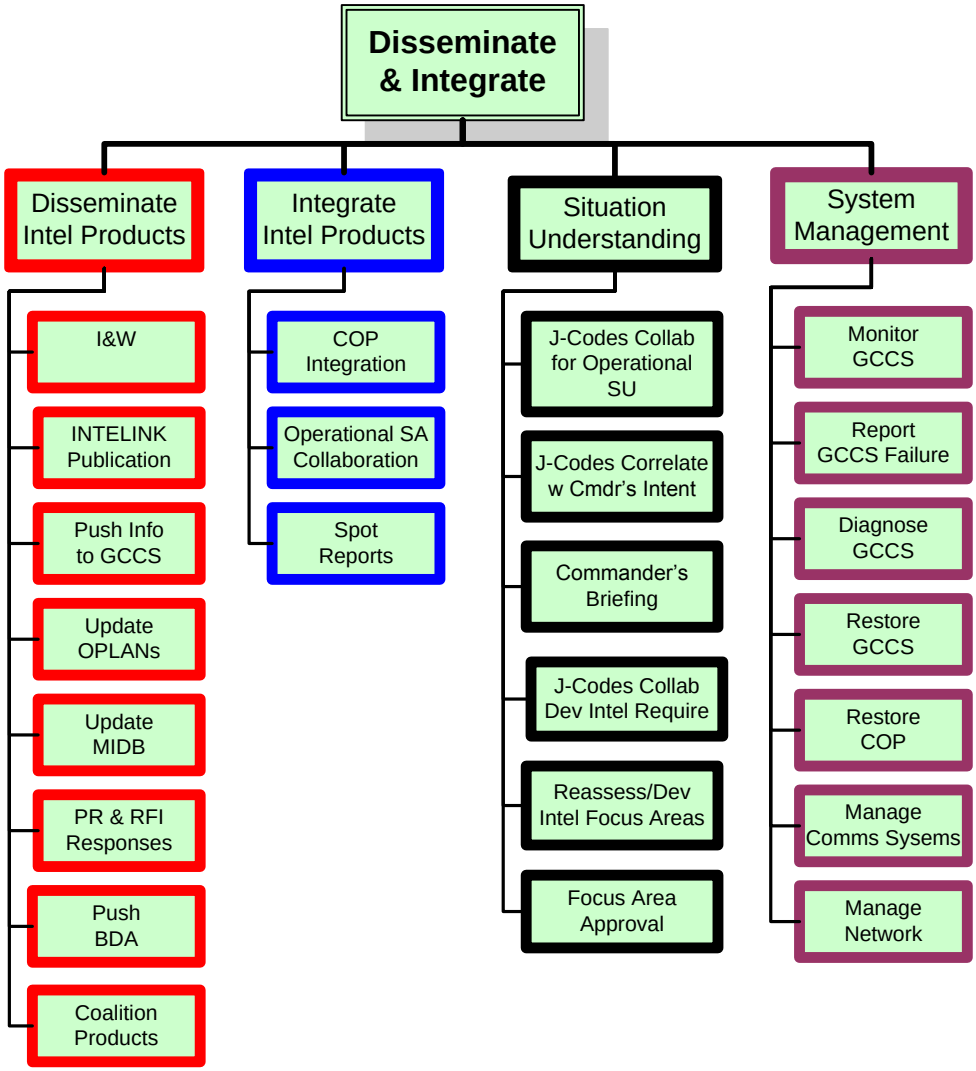


Figure 4.7 OV5 diagram of activity structure for the Disseminate and Integrate activity

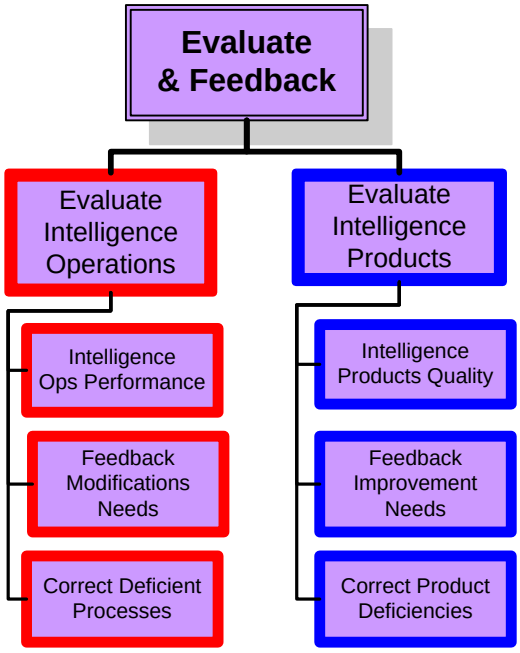


Figure 4.8 OV5 diagram of activity structure for the Evaluate and Feedback activity

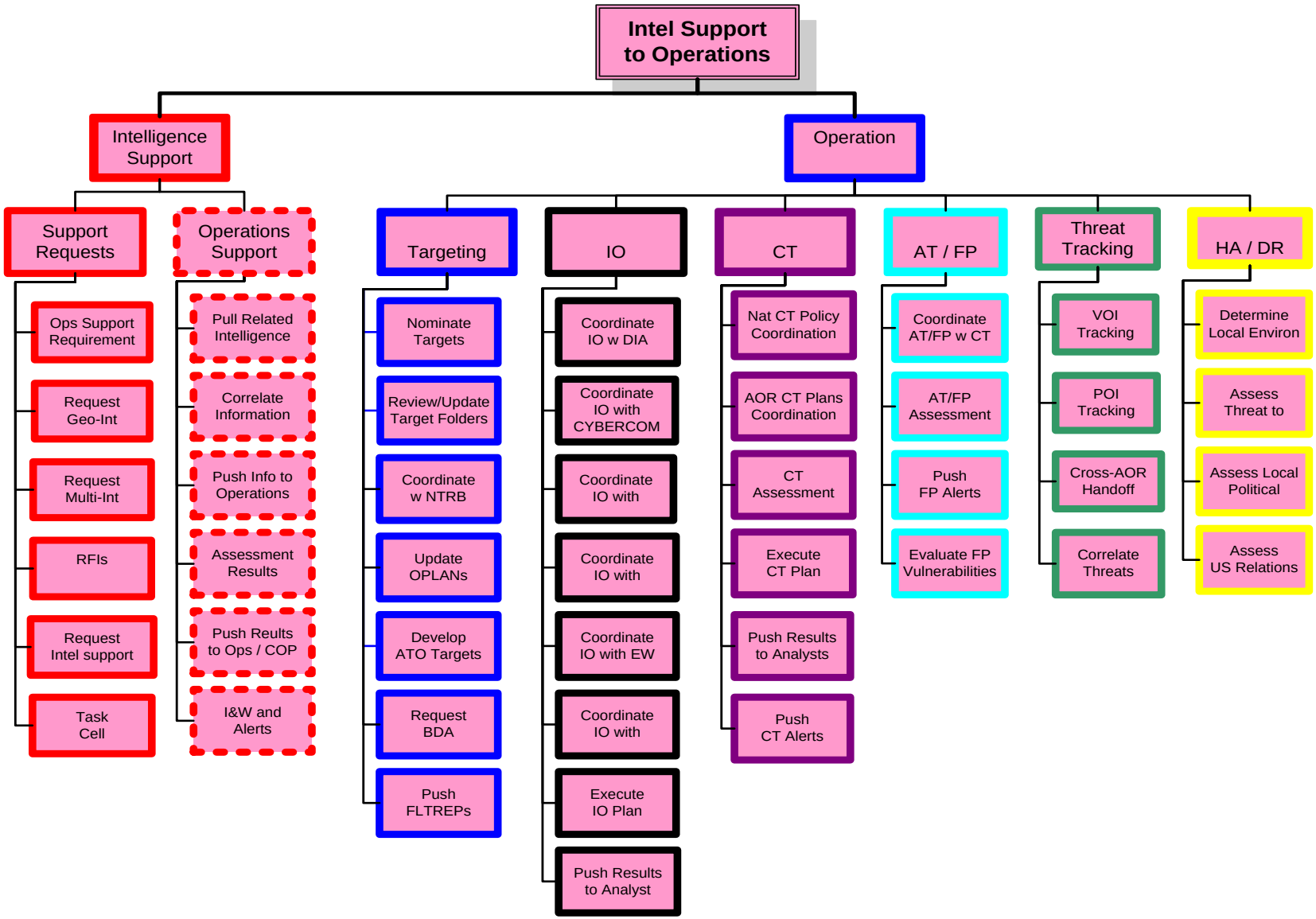


Figure 4.9 OV5 diagram of activity structure for the Intelligence Support to Operations activity

5.0 SWIM-LANE DIAGRAMS

Swim-lane diagrams contain:

- JIOC operations tasks
- Organizations that perform them
- Information exchanged between tasks
- Task sequence

This depiction contains much more information that the OV-5 diagram, which only shows the activity/task structure. It is the swim-lane depiction that is utilized for the BPM uses listed in Section 2.3, including being the underlying model for simulation development.

5.1 Diagrams Description

With over 300 activities, each with one or more information exchanges, these diagrams become complex. Specific symbols and conventions are used to make them easier to follow. The conventions are shown in Figure 5.1.

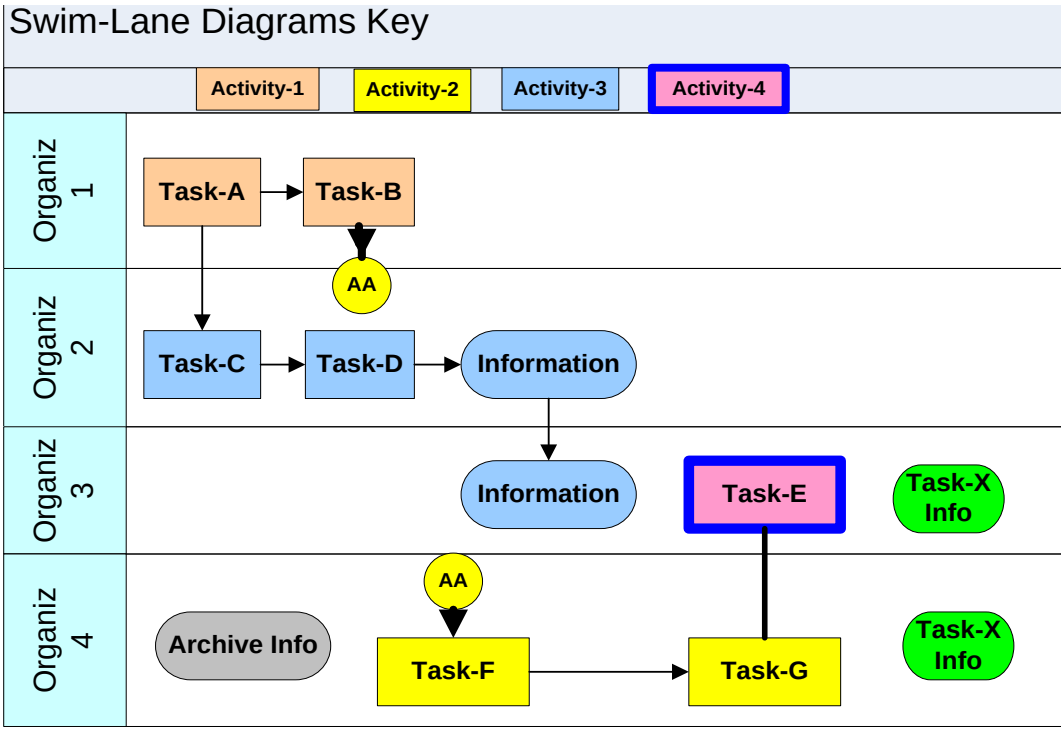
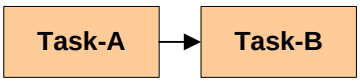


Figure 5.1 Swim-Lane Diagrams Symbols and Conventions

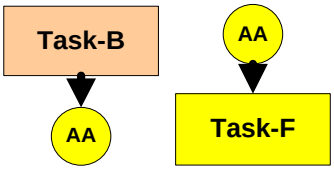
Swim-lane diagrams show the sequence of activities, but not the time when they occur. Time is only roughly left to right. Even though Tasks B, D, and F are at approximately the same place along the horizontal, there is no implication that they occur at the same time. Only the sequence is important. Task D could be hours after Task-F, but it must occur after Task-C.

The four upper rectangles along the title bar show that there are four Activities in the diagram (and their 7 tasks). The colors of the rectangles show that Tasks A and B are tasks under Activity-1, etc.



Task Blocks

- A box contains text that identifies the task.
- The header on a lane shows the organization that performs the activity, so A and B are both performed by Organization-1.
- The arrow shows that information that is produced by Task-A is passed on to Tasks B and C for their use.
- The information that is passed is indicated by the title of the task.



Information Throw and Catch (small circle)

Throw and catch can be used in place of arrows because the complete diagram is too messy with only lines for information exchanges.

- Activity-B sends its output information to Activity-F.
- There can be more than one throw for a catch, and catches for a throw.
- The letter codes in the throw-catch are used only for identification.
- The color for the throw-catch indicates the principal activity-type involved.

Information exchange

The function is different than the throw-catch circles.

- Throw-catch circles denote direct information exchange between two activities.
- Rounded rectangles denote information sent to an organization. It may be used by any activity, at any location, in the swim lane. There is no sequence associated with it. E.g., in Figure 5.1, the "blue" information can be used by any task done by Organizations 2 or 3, to the right of where the information is created or introduced into the lane.
- Task-E can use the blue information and/or the information produced by Task-X (green), which is somewhere else in the BPM diagram.
- Tasks F and G can use information pulled from an archive and also the Task-X information. The implication is that Task-X is executed before F and G.

5.2 JIOC Baseline BPM Swim-Lane Diagram

The full swim-lane diagram is presented in Figure 5.2.

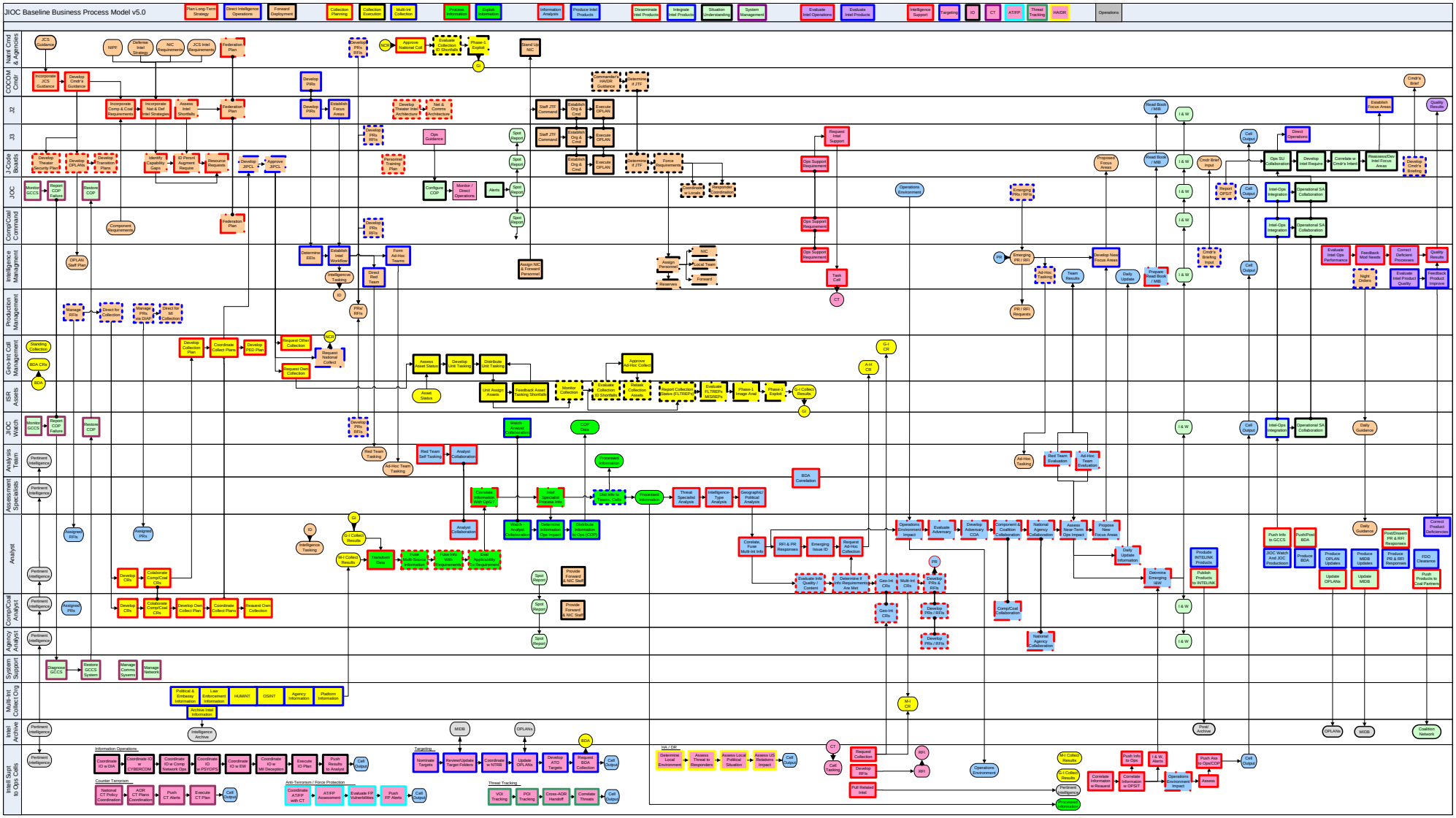


Figure 5.2 JIOC Baseline BPM swim-lane depiction

6.0 Baseline Intelligence Activities

Baseline intelligence activities are those activities and tasks that every intelligence center must be able to execute. There is no best way to aggregate these activities into groups. The 25 groupings we present below are logical and in conformance with the Joint Publications activities. Some tasks are included here that are not shown in the above OV-5 diagrams and the Baseline BPM. This is in order to make these activity diagrams as complete and useful as needed to evaluate JIOC capabilities. Section 7 shows how these diagrams can be used to evaluate JIOC capabilities.

These are also swim-lane diagrams. As with the BPM, generic organizations are used. When the BPM for a specific COCOM is developed, its specific organizations will be used and more tasks will be included.

The basic activity groups are:

1 Plan long-term strategy
2 Near-term intelligence guidance
3 Manage intelligence operations
4 Production Request and Request For Information (RFI) Management
5 GEOINT Collection Planning
6 GEOINT Collection Execution
7 Multi-Int Collection
8 Watch / COP
9 GCCS Management
10 Information Analysis
11 Operations Assessment
12 Ad-Hoc team
13 Red Team
14 Targeting
15 Information Operations
16 Anti-Terrorism / Force Protection
17 Counter Terrorism
18 Humanitarian Assistance / Disaster Relief
19 Joint Task Force
20 Threat Tracking
21 Disseminate
22 Integrate
23 Situation Awareness and Understanding
24 Operations Support
25 Evaluate and Feedback

There is overlap between the activities, thus some tasks will appear in more than one diagram.

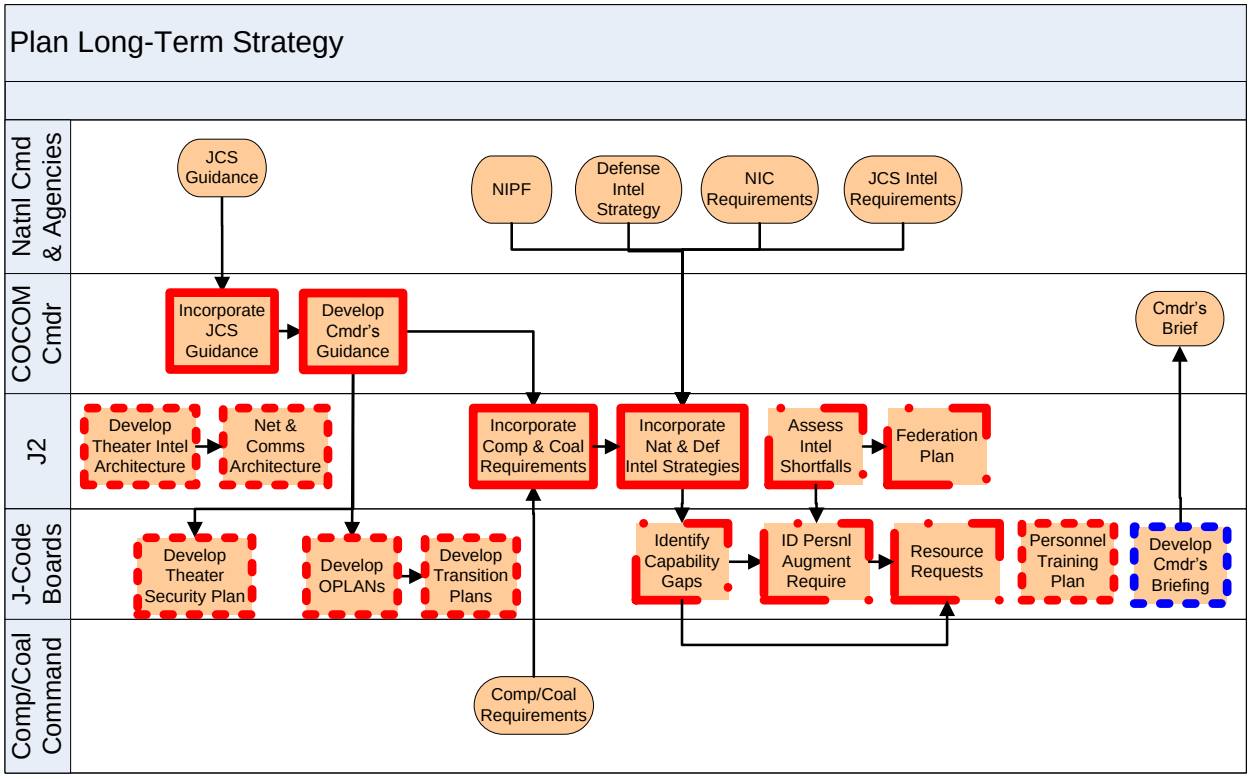


Figure 6.1 Plan long-term strategy

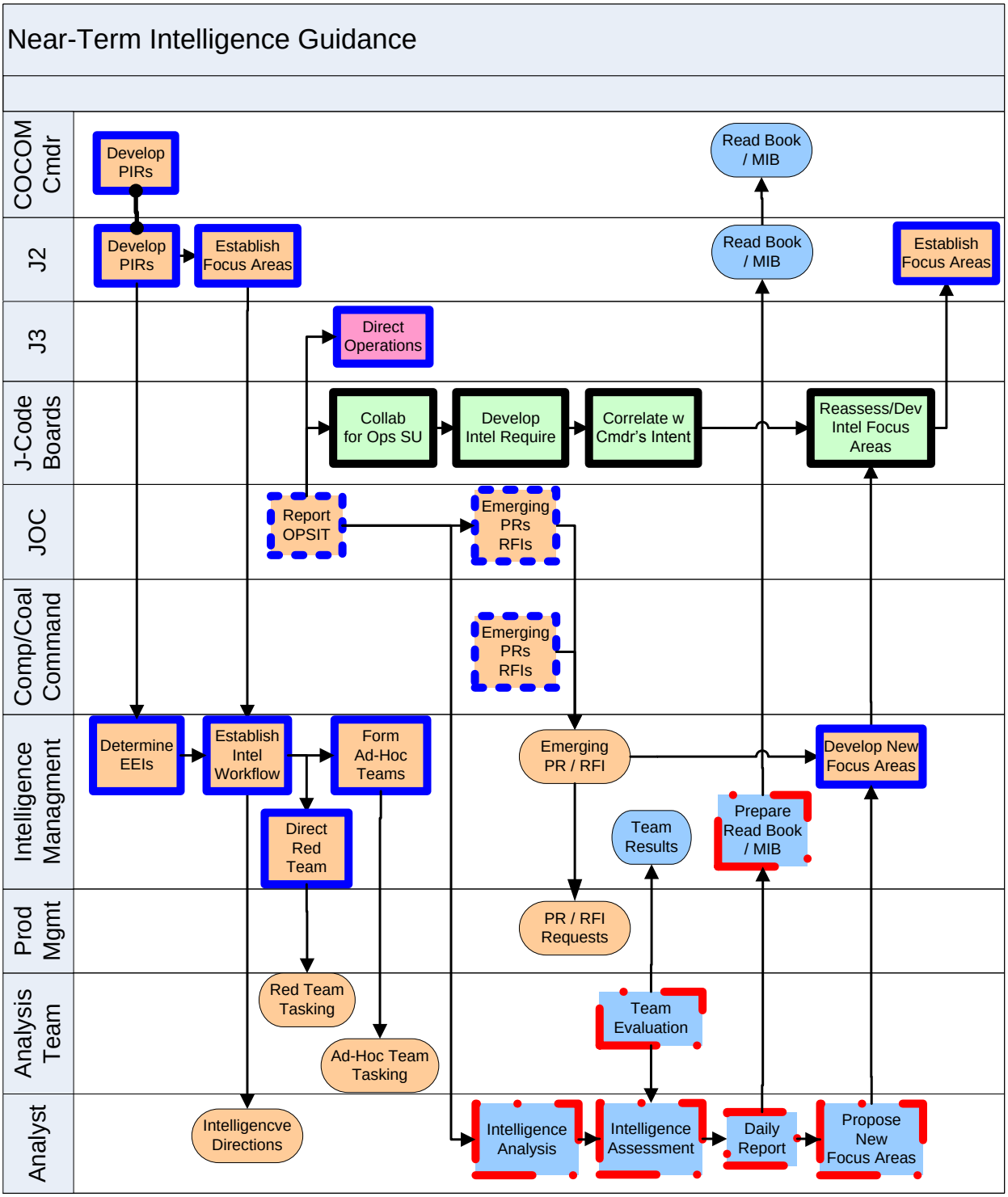


Figure 6.2 Near-term intelligence guidance

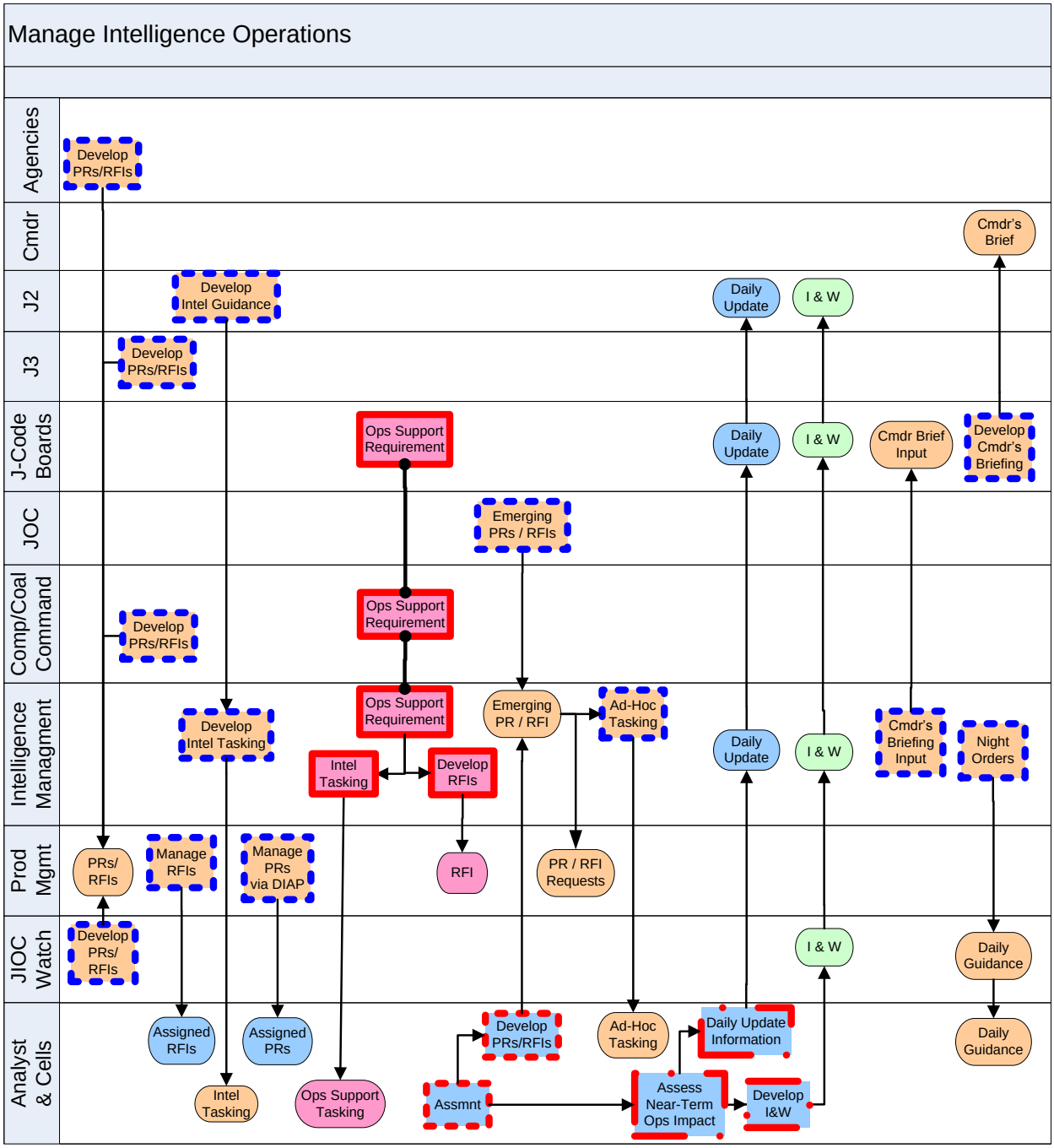


Figure 6.3 Manage intelligence operations

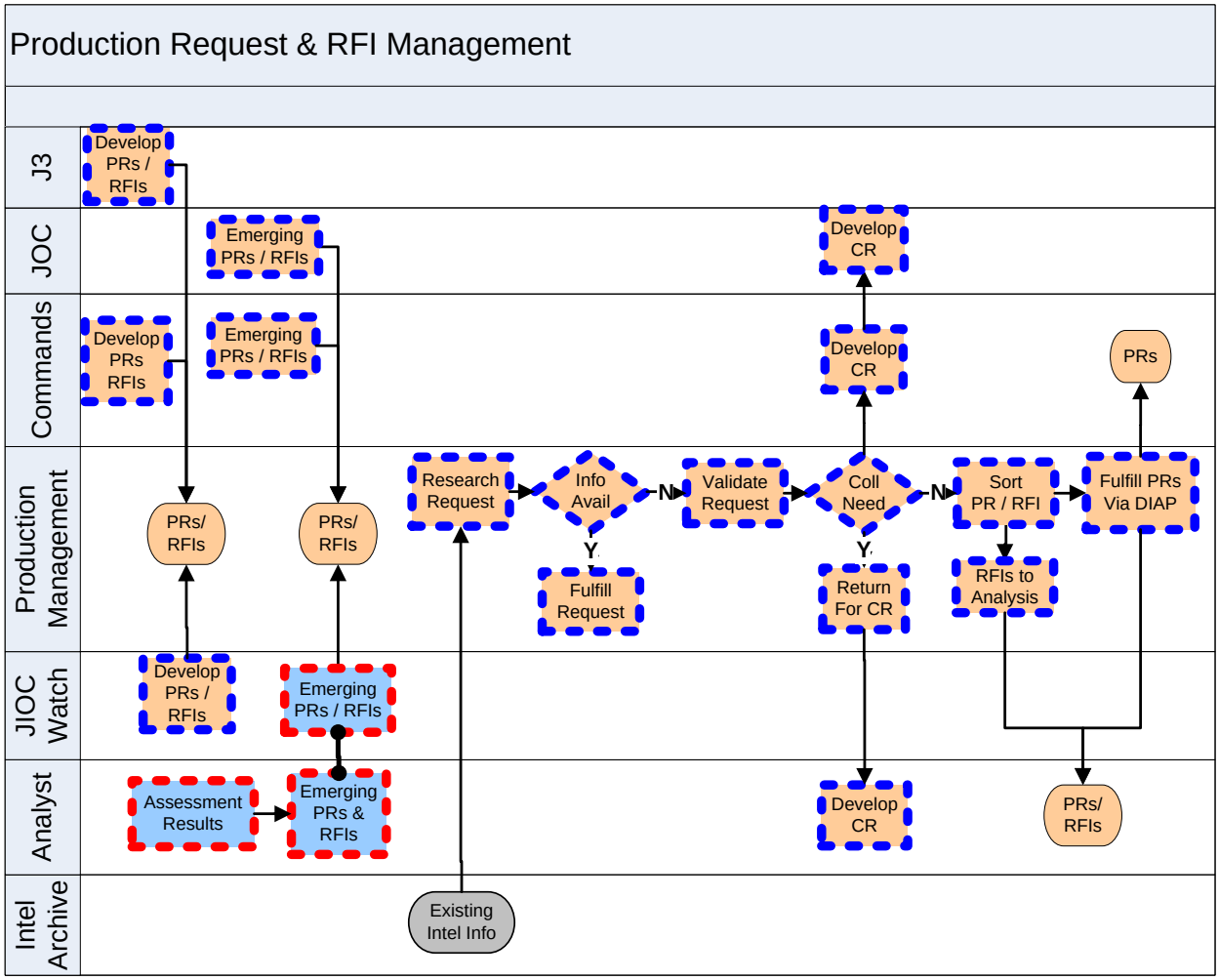


Figure 6.4 Production Request and RFI Management

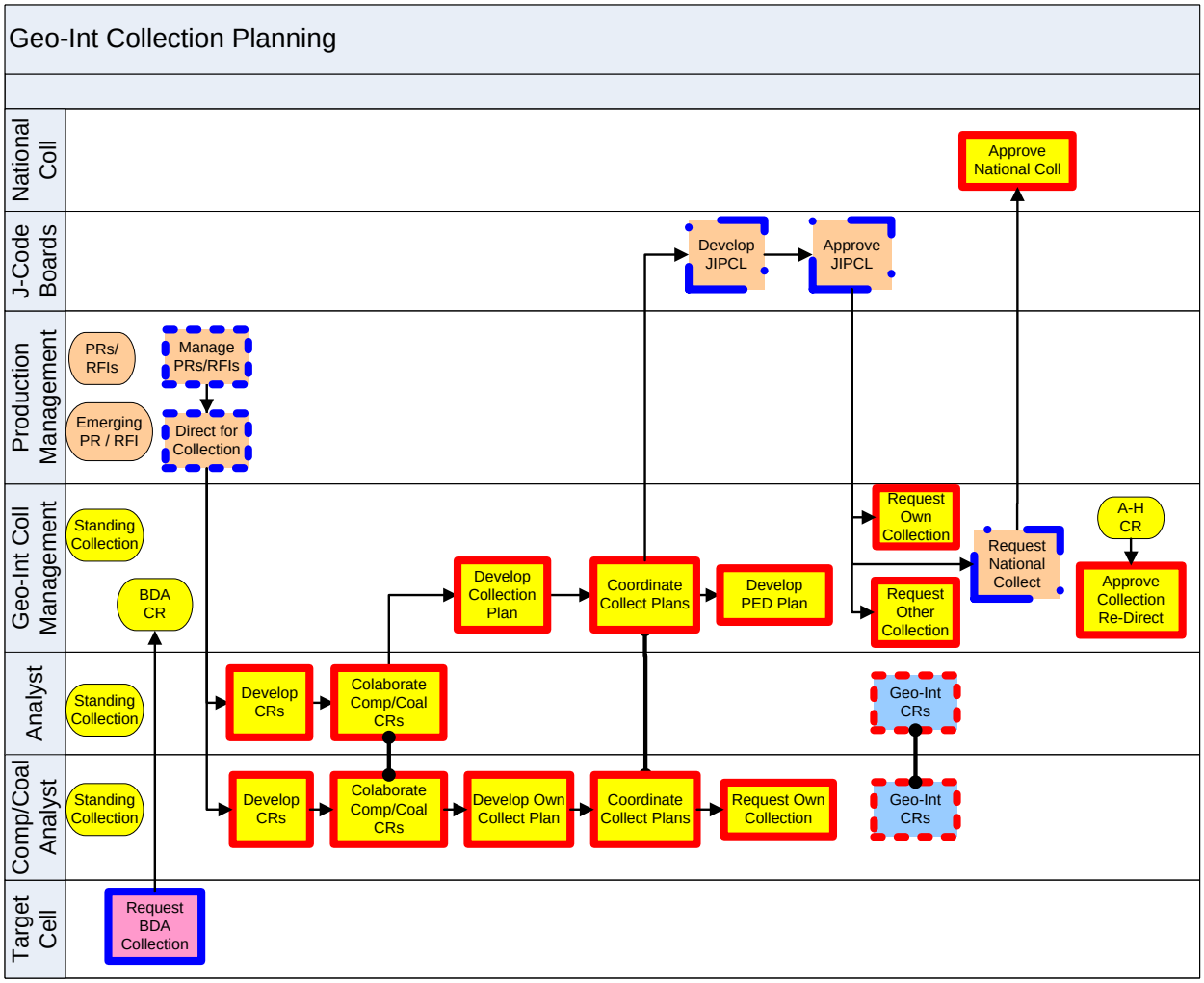


Figure 6.5 GEOINT Collection Planning

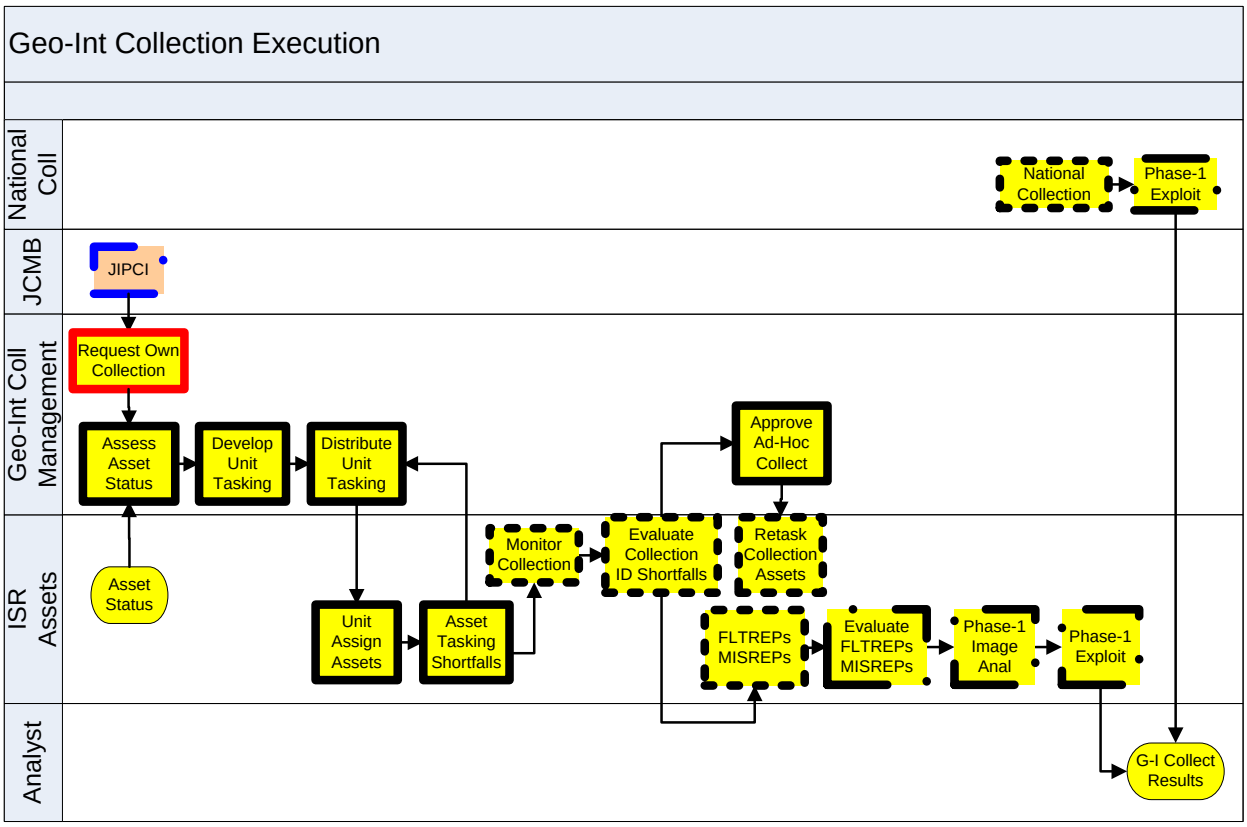


Figure 6.6 GEOINT Collection Execution

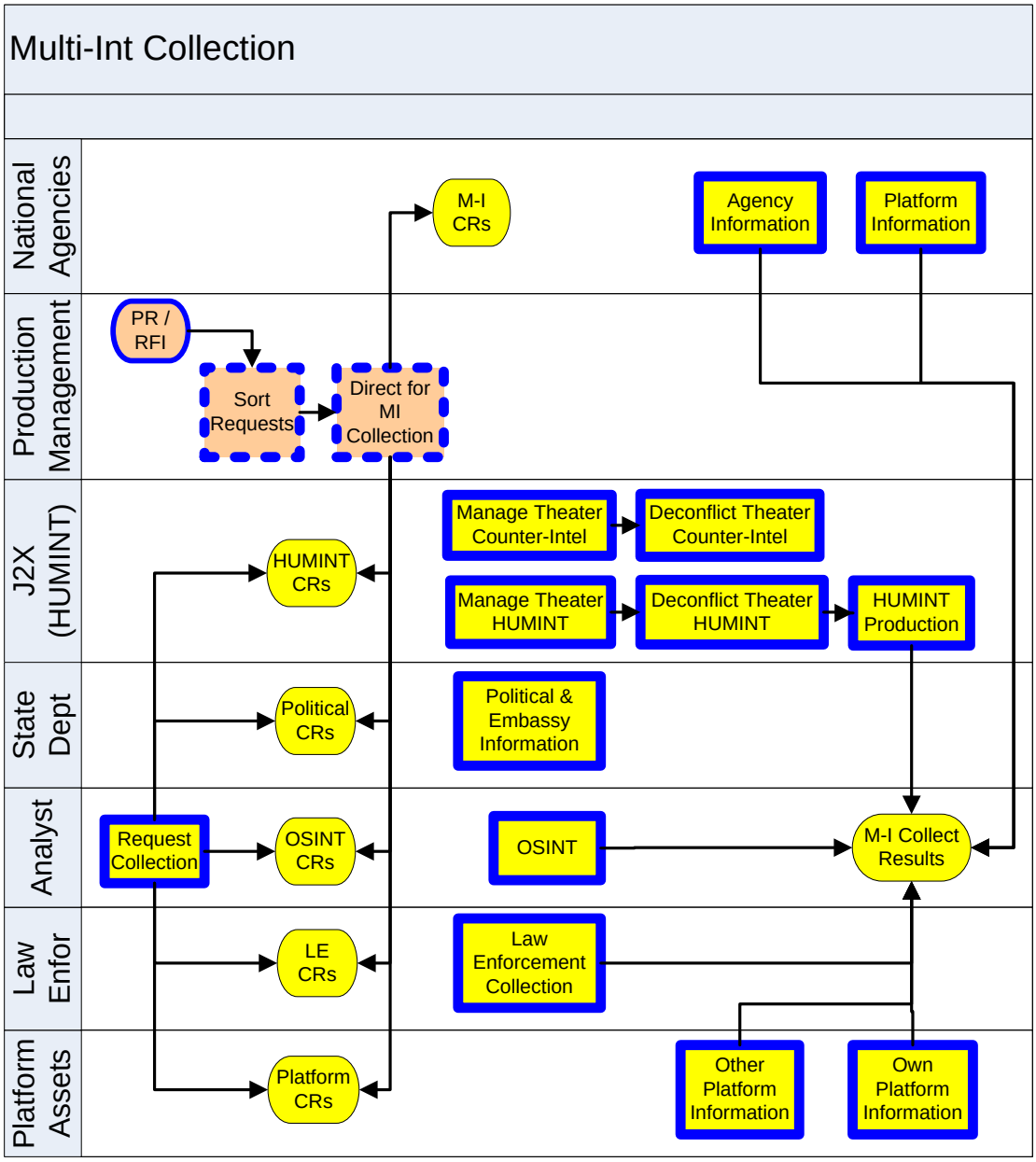


Figure 6.7 Multi-Int Collection

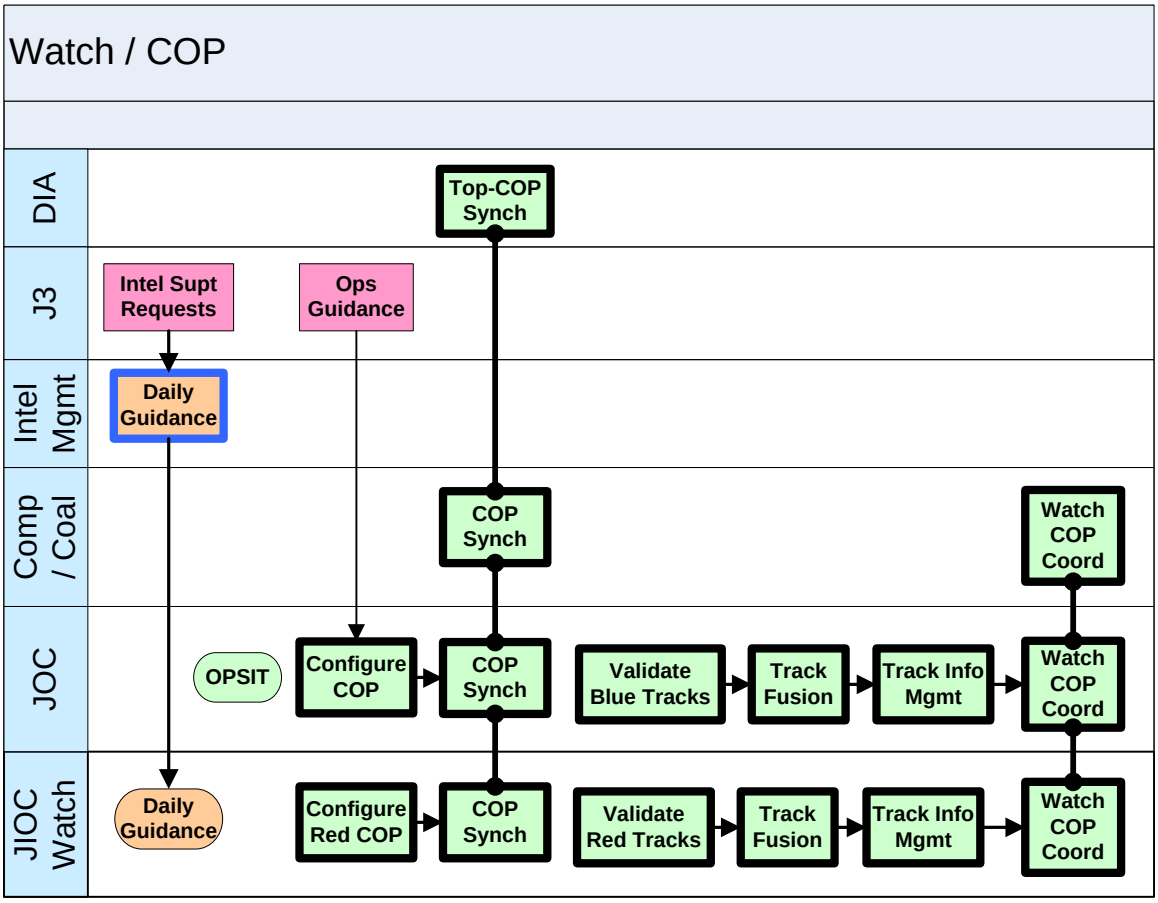


Figure 6.8 Watch / COP

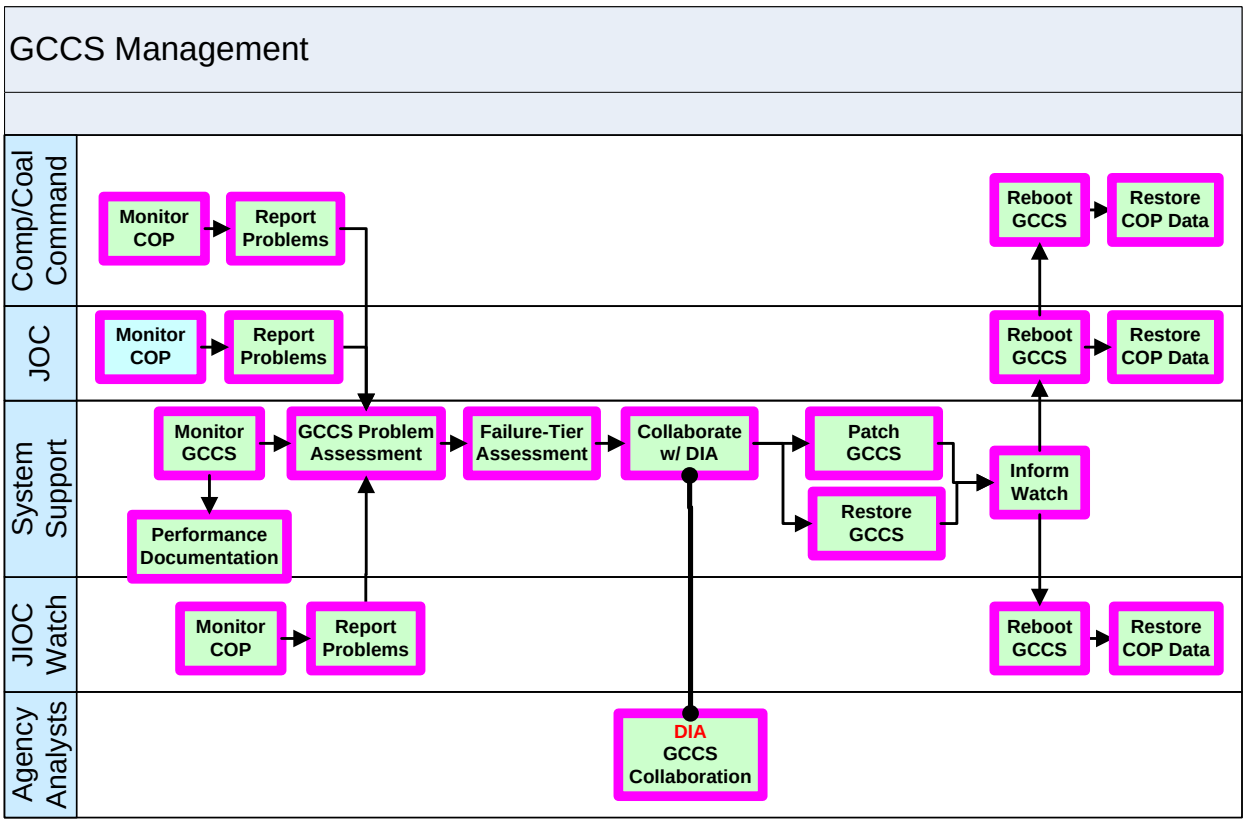


Figure 6.9 GCCS Management

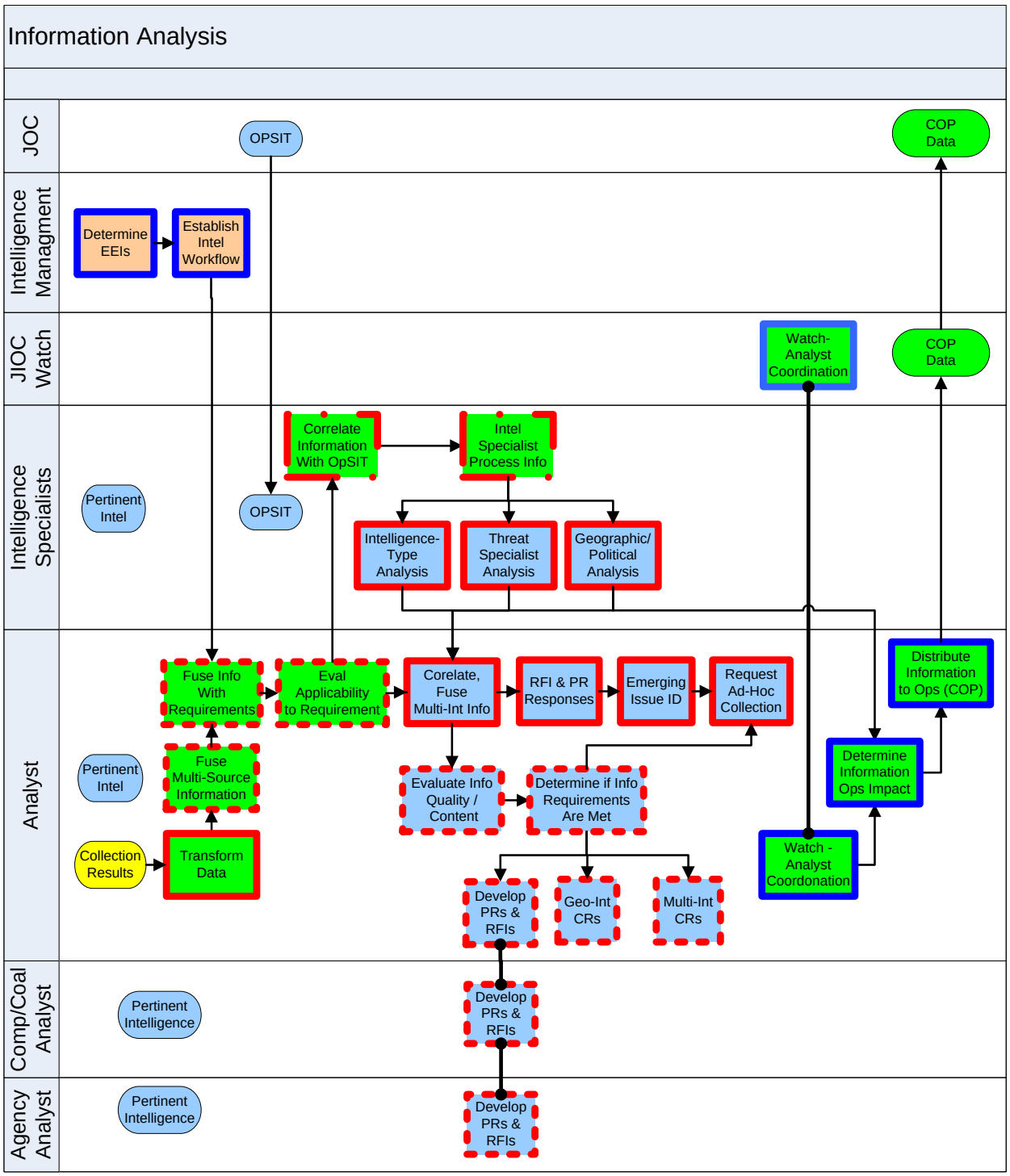


Figure 6.10 Information Analysis

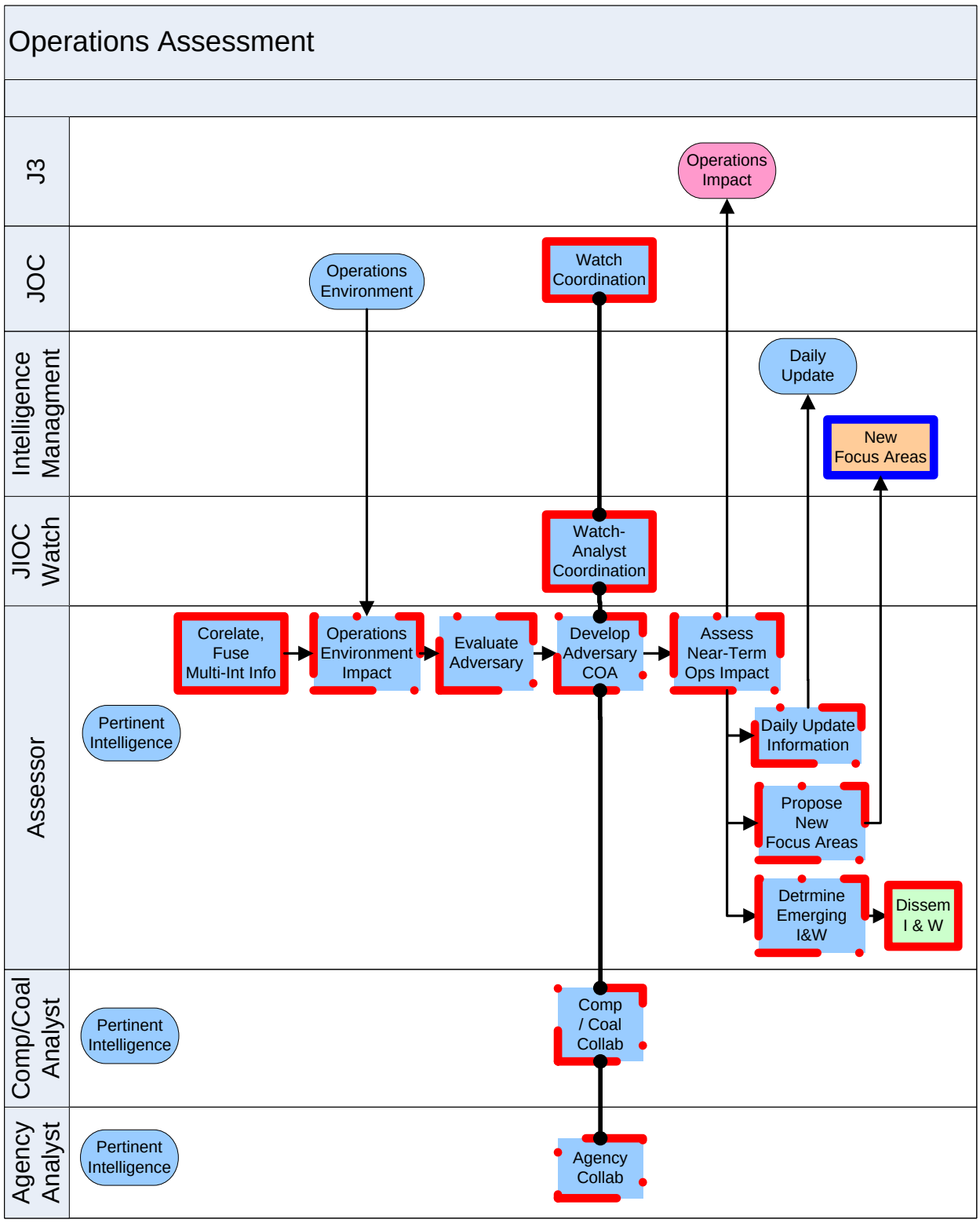


Figure 6.11 Operations Assessment

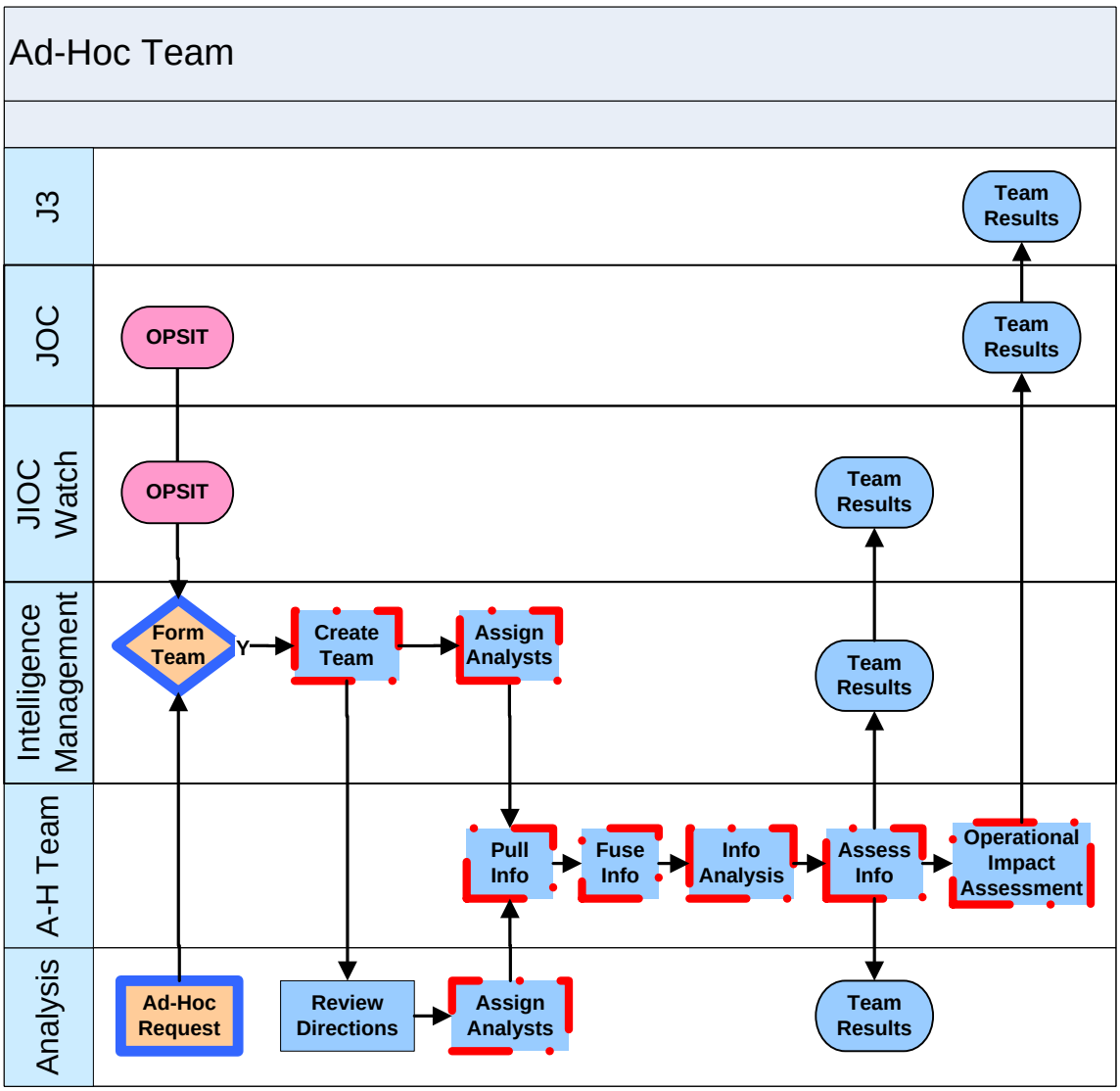


Figure 6.12 Ad-Hoc team

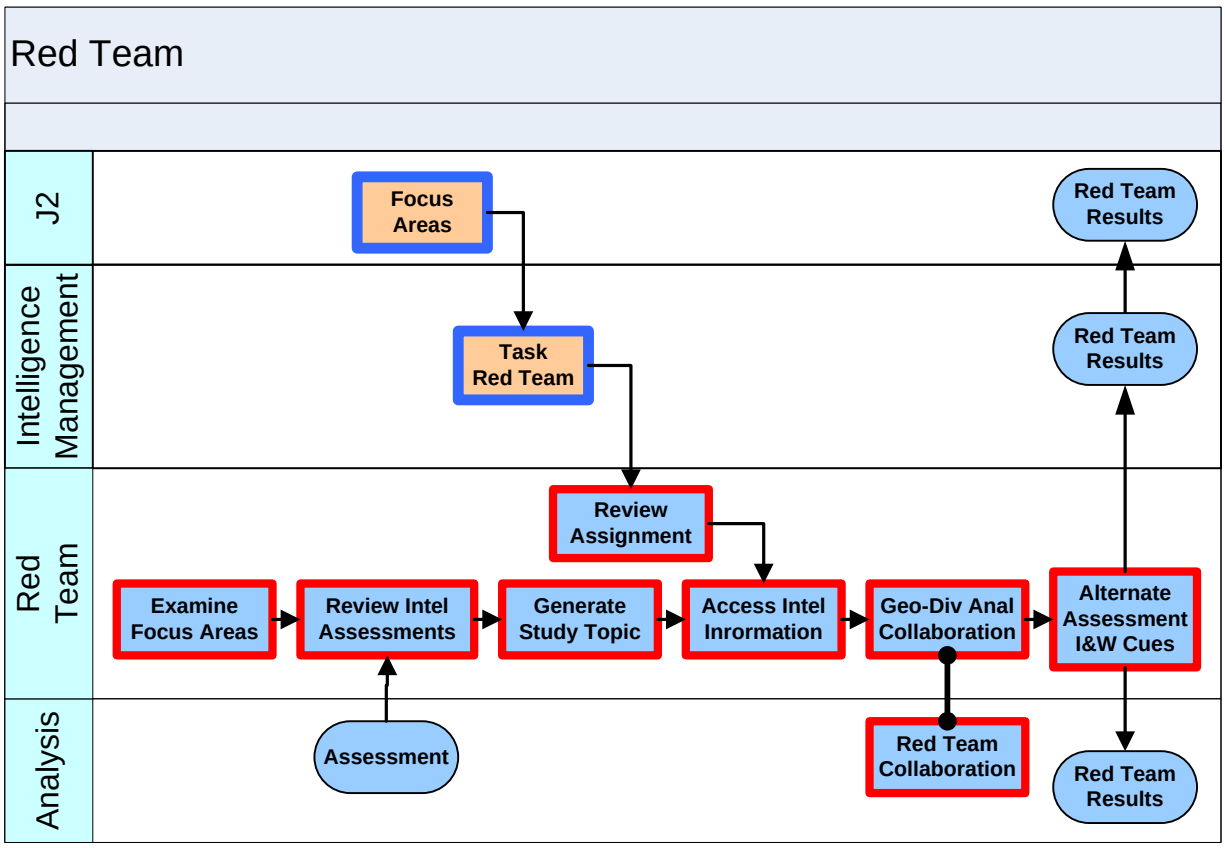


Figure 6.13 Red Team

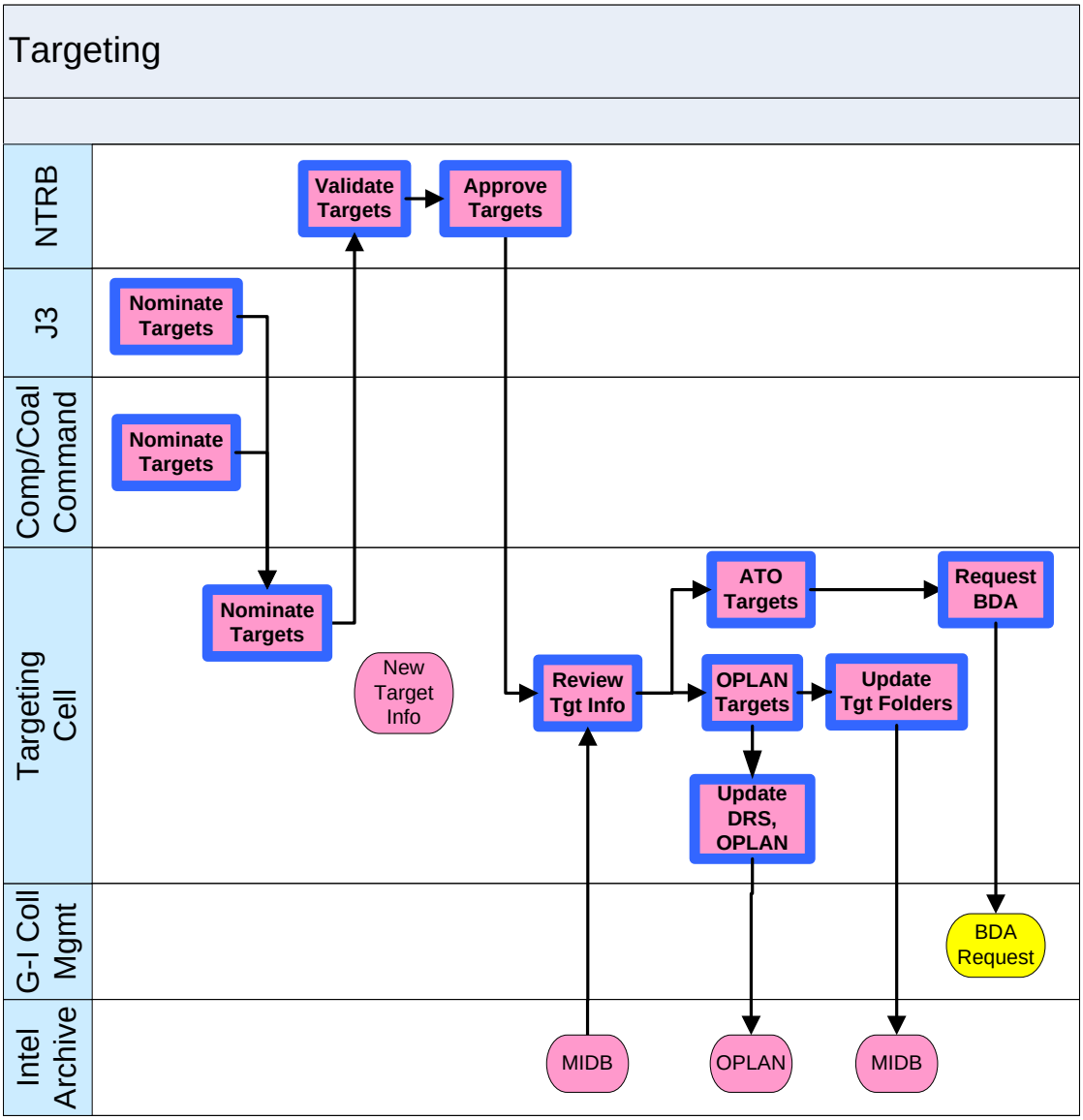


Figure 6.14 Targeting

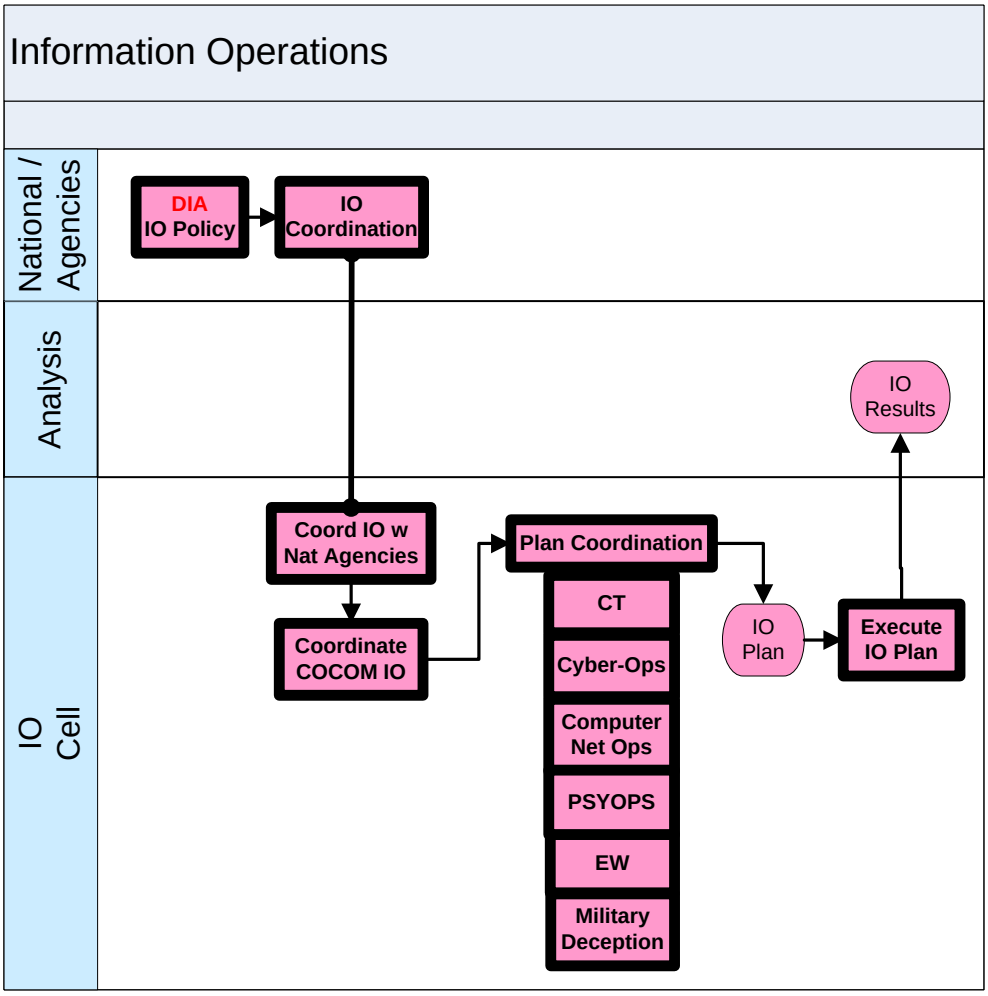


Figure 6.15 Information Operations

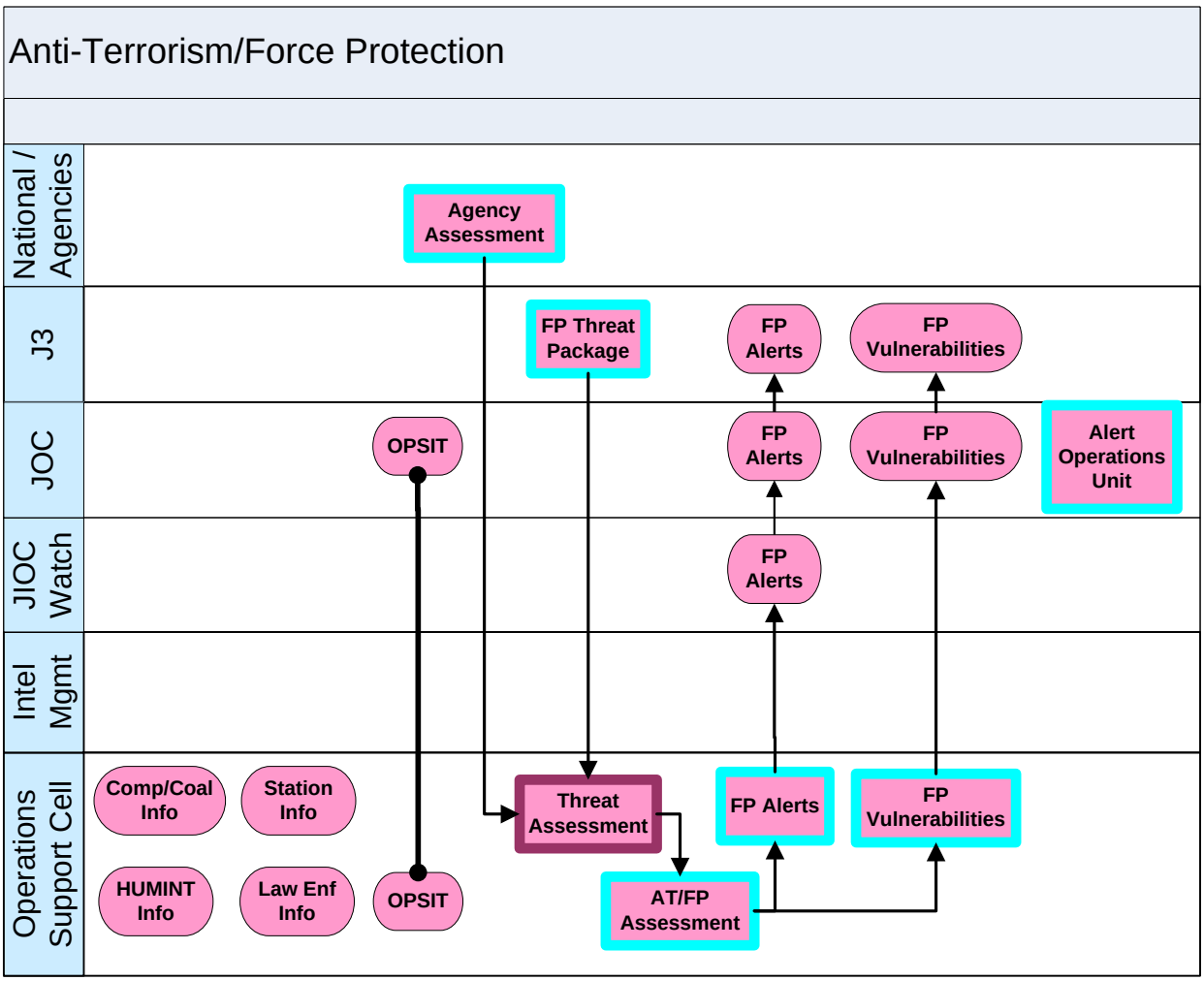


Figure 6.16 Anti-Terrorism / Force Protection

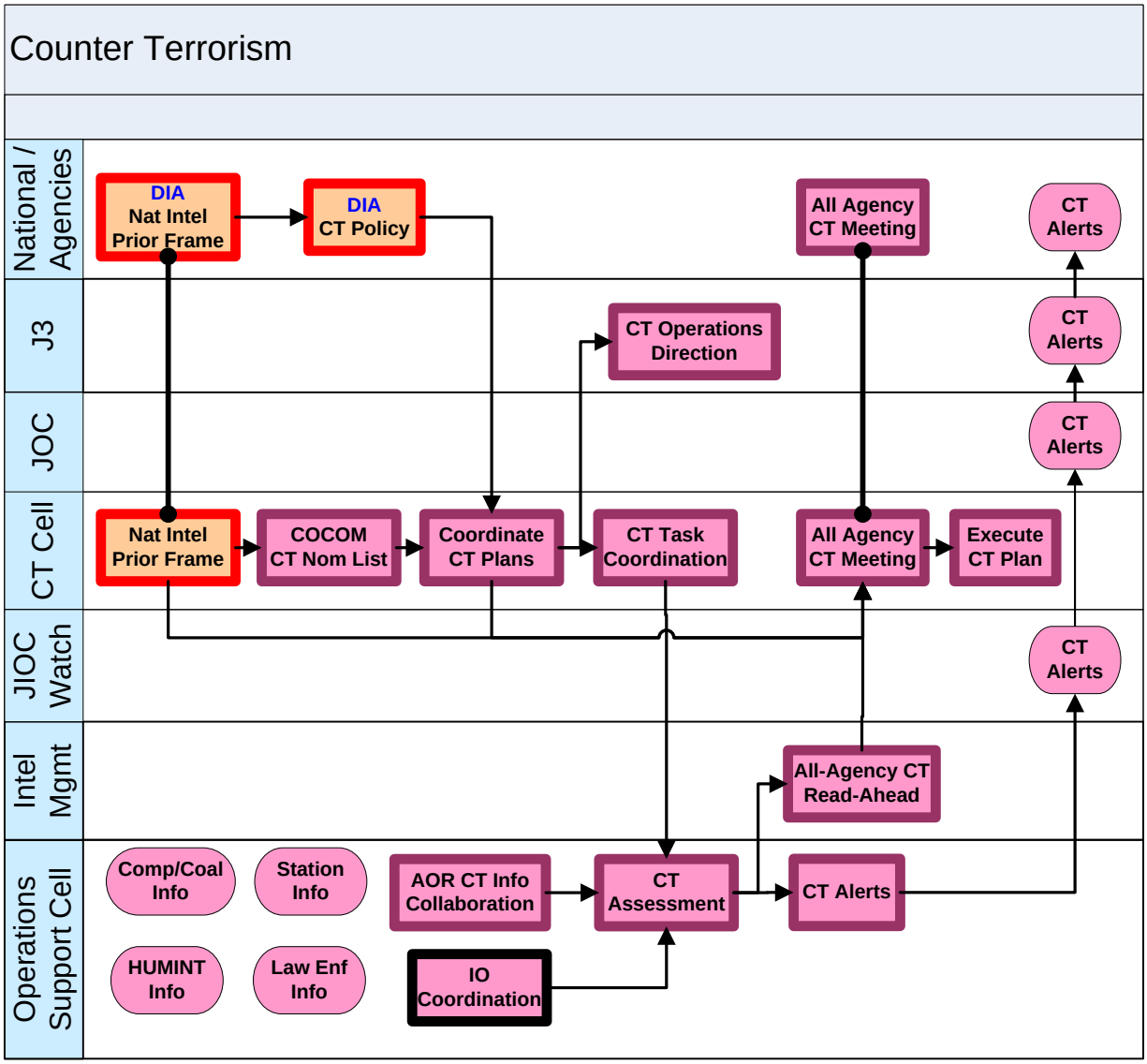


Figure 6.17 Counter Terrorism

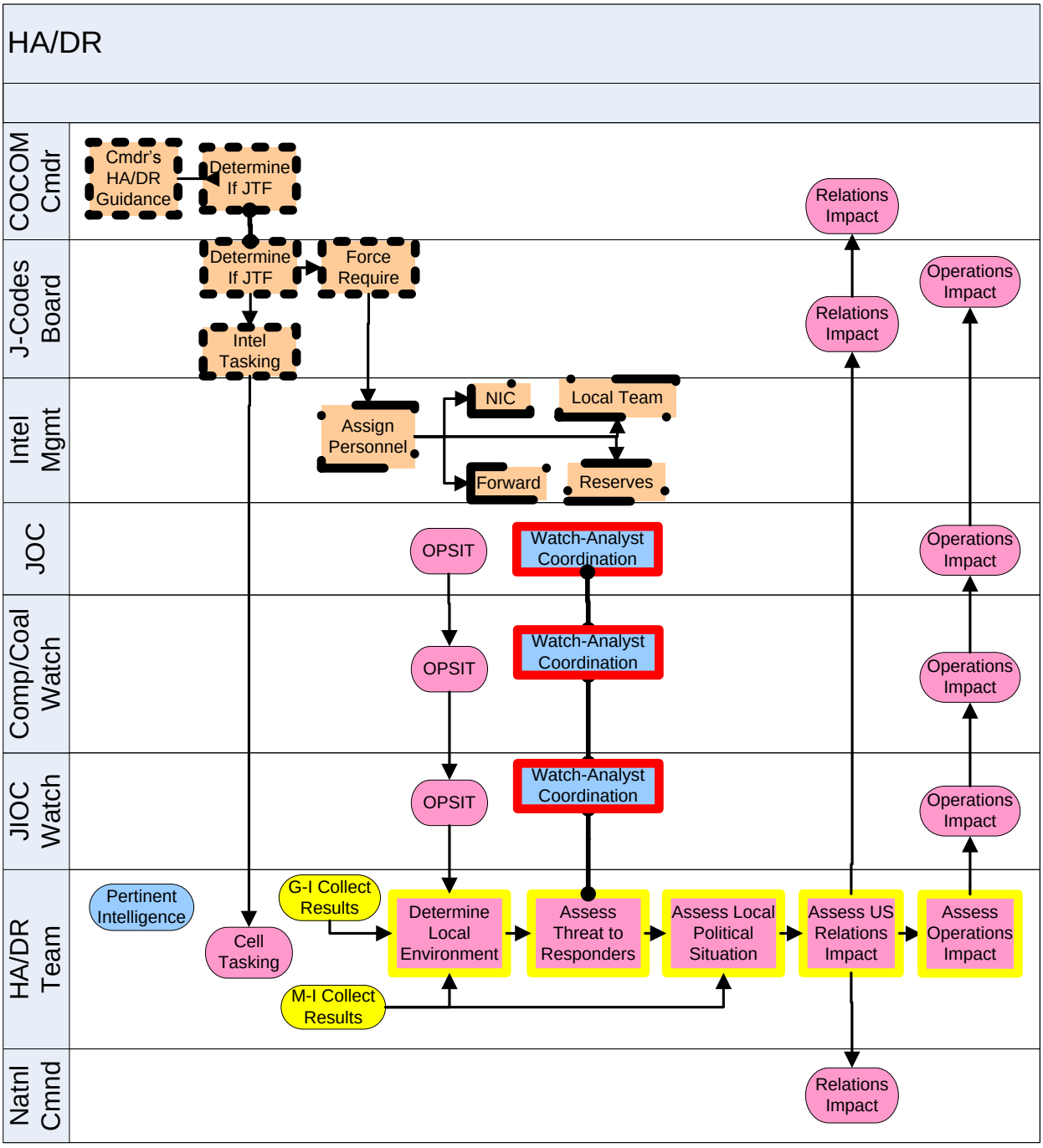


Figure 6.18 Humanitarian Assistance / Disaster Relief

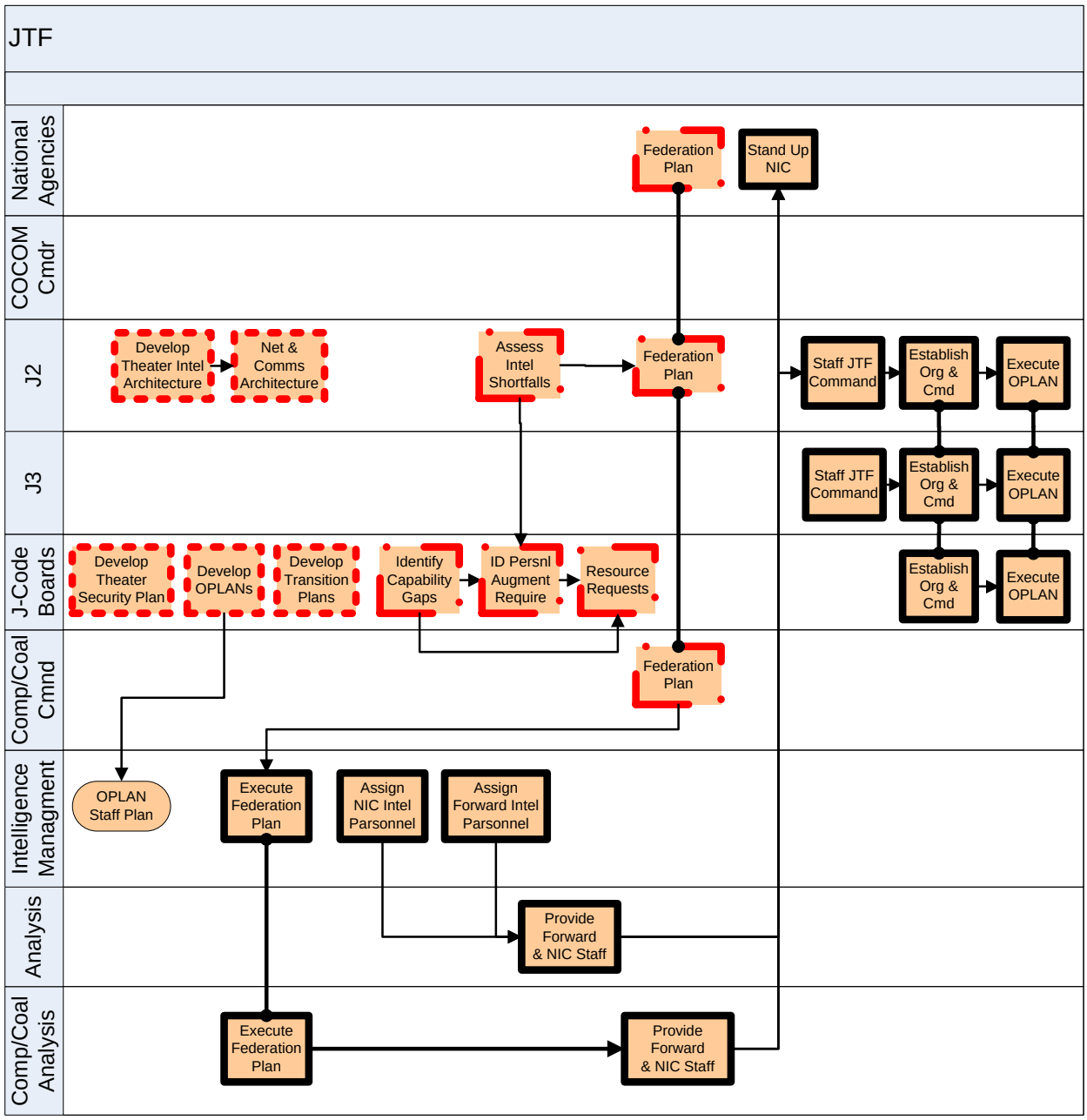


Figure 6.19 Joint Task Force

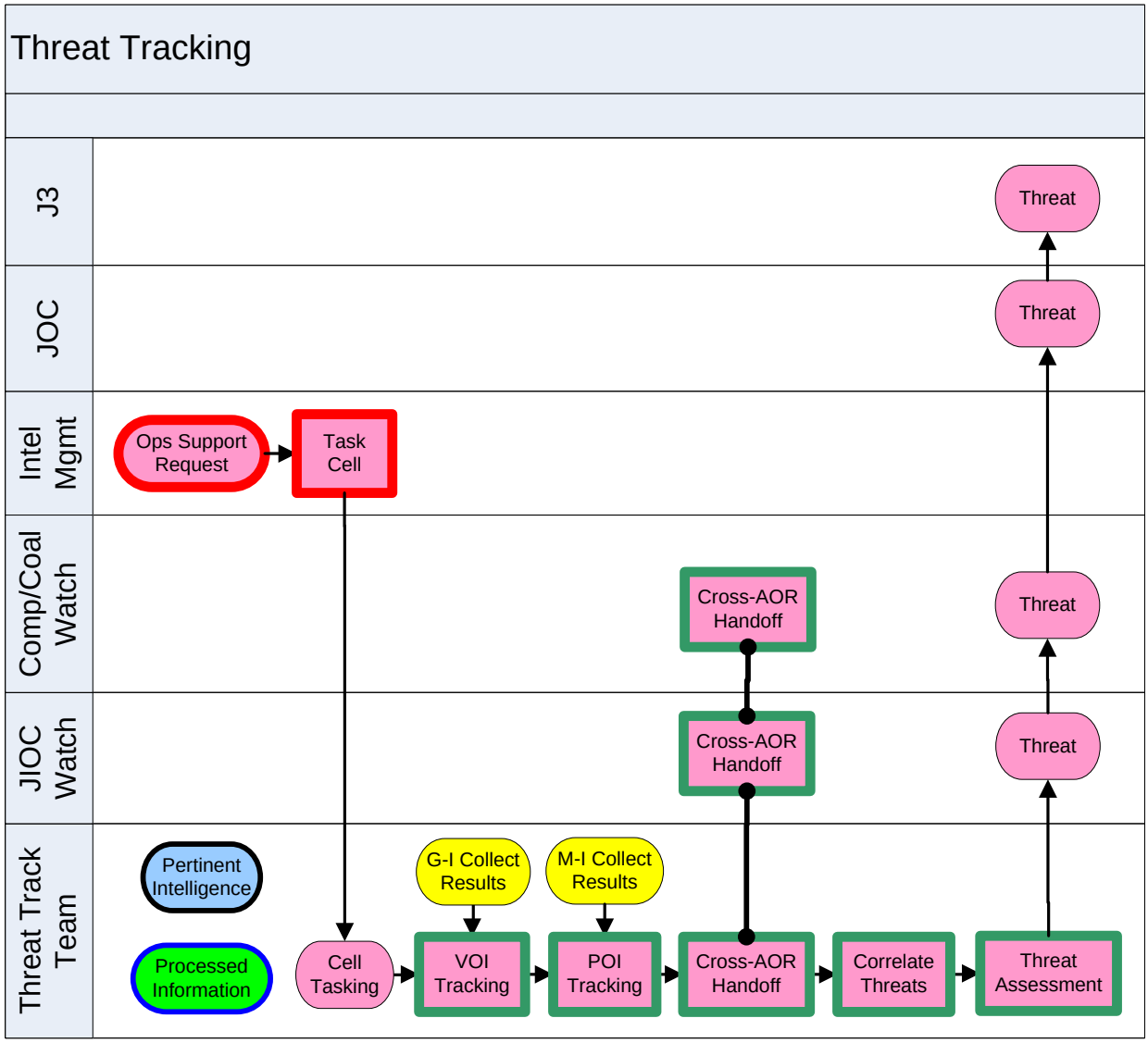


Figure 6.20 Threat Tracking

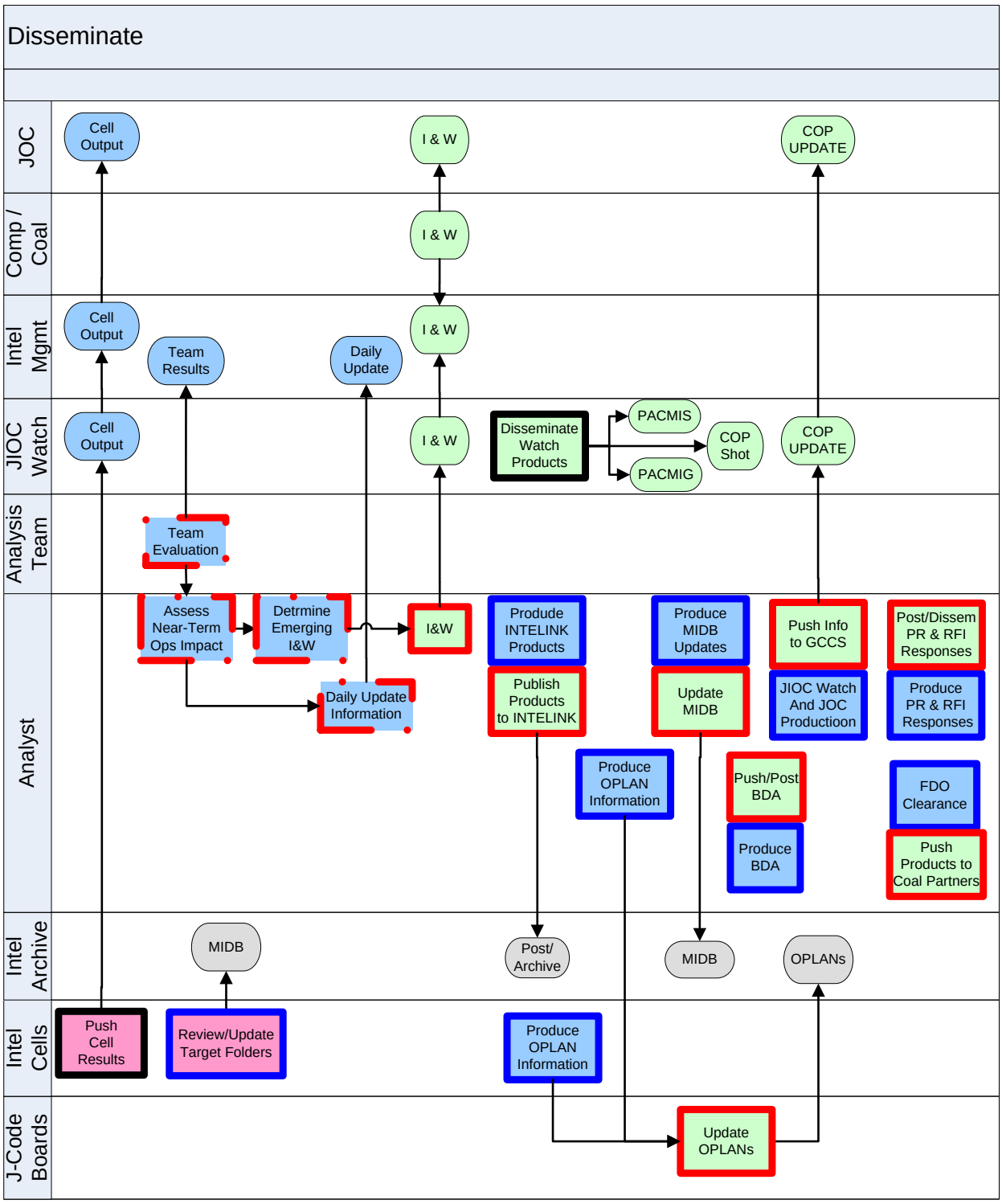


Figure 6.21 Disseminate

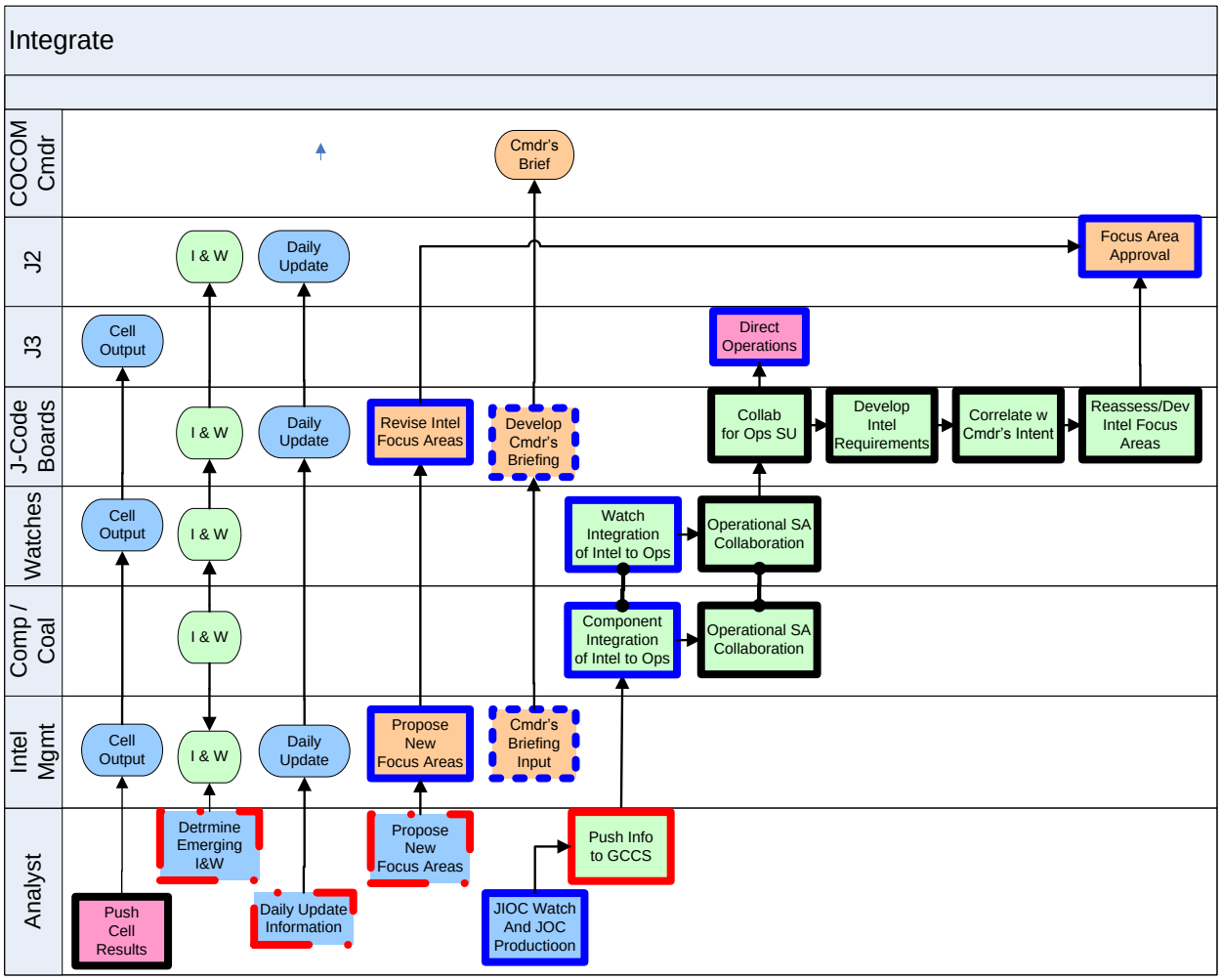


Figure 6.22 Integrate

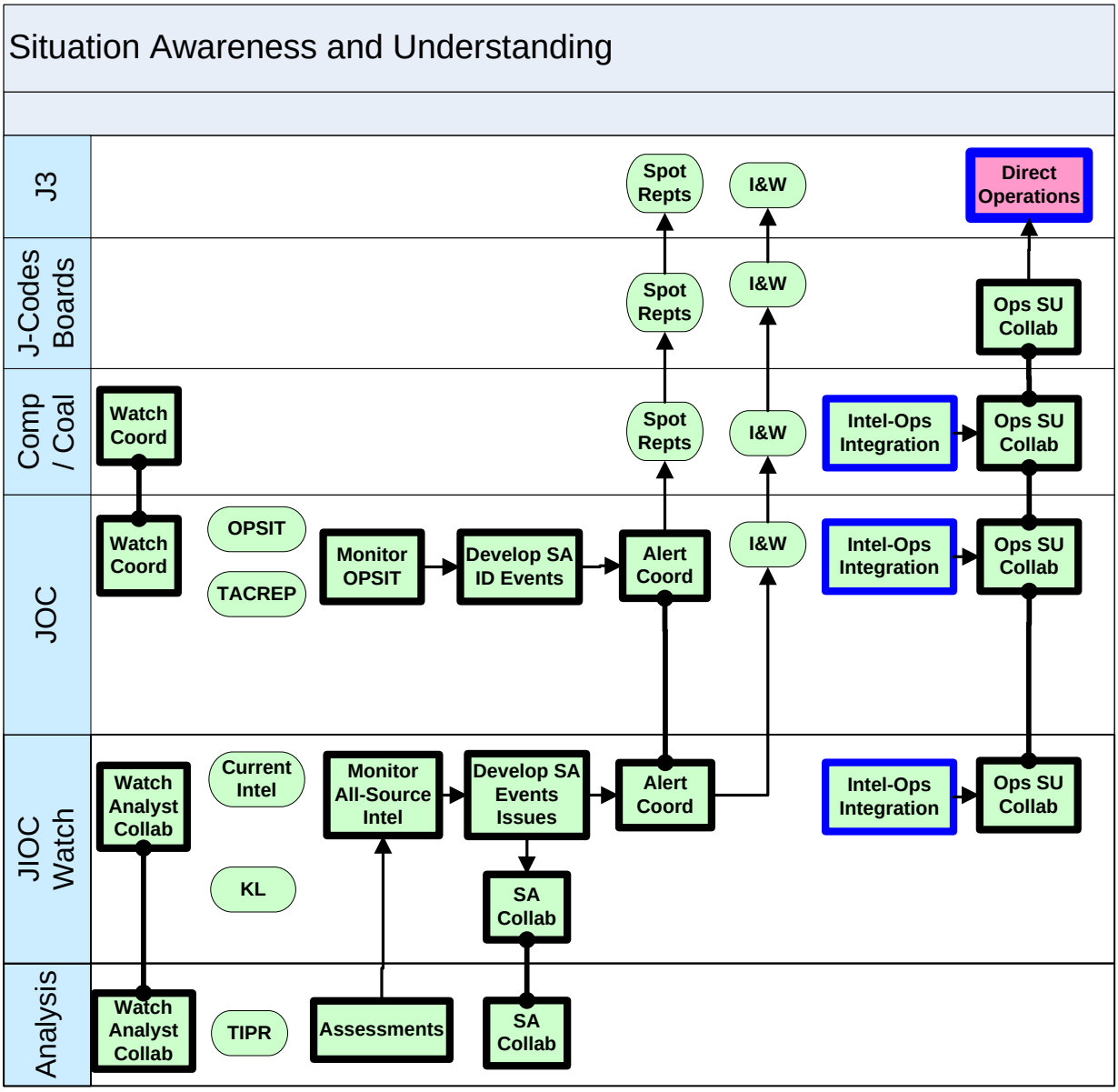


Figure 6.23 Situation Awareness and Understanding

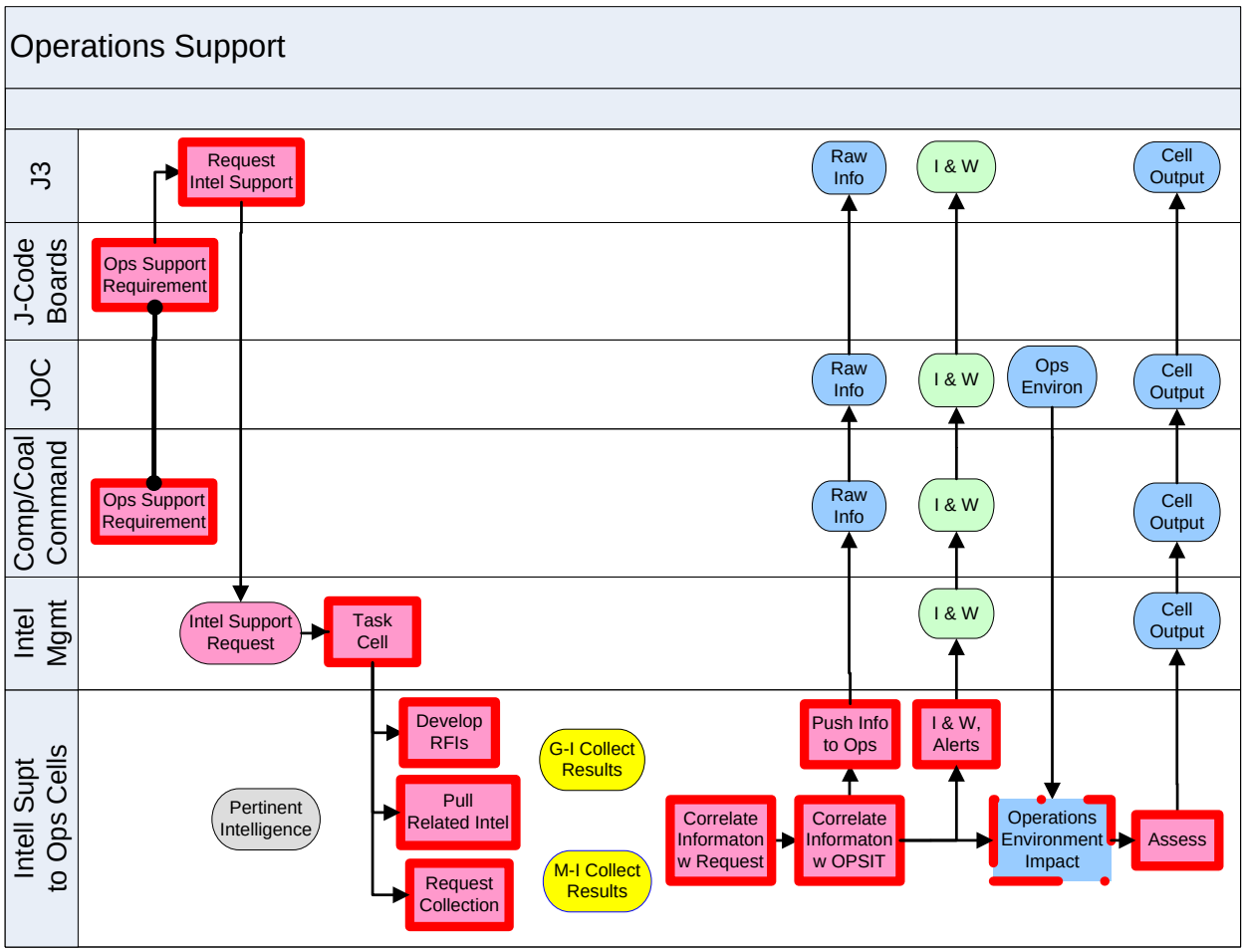


Figure 6.24 Operations Support

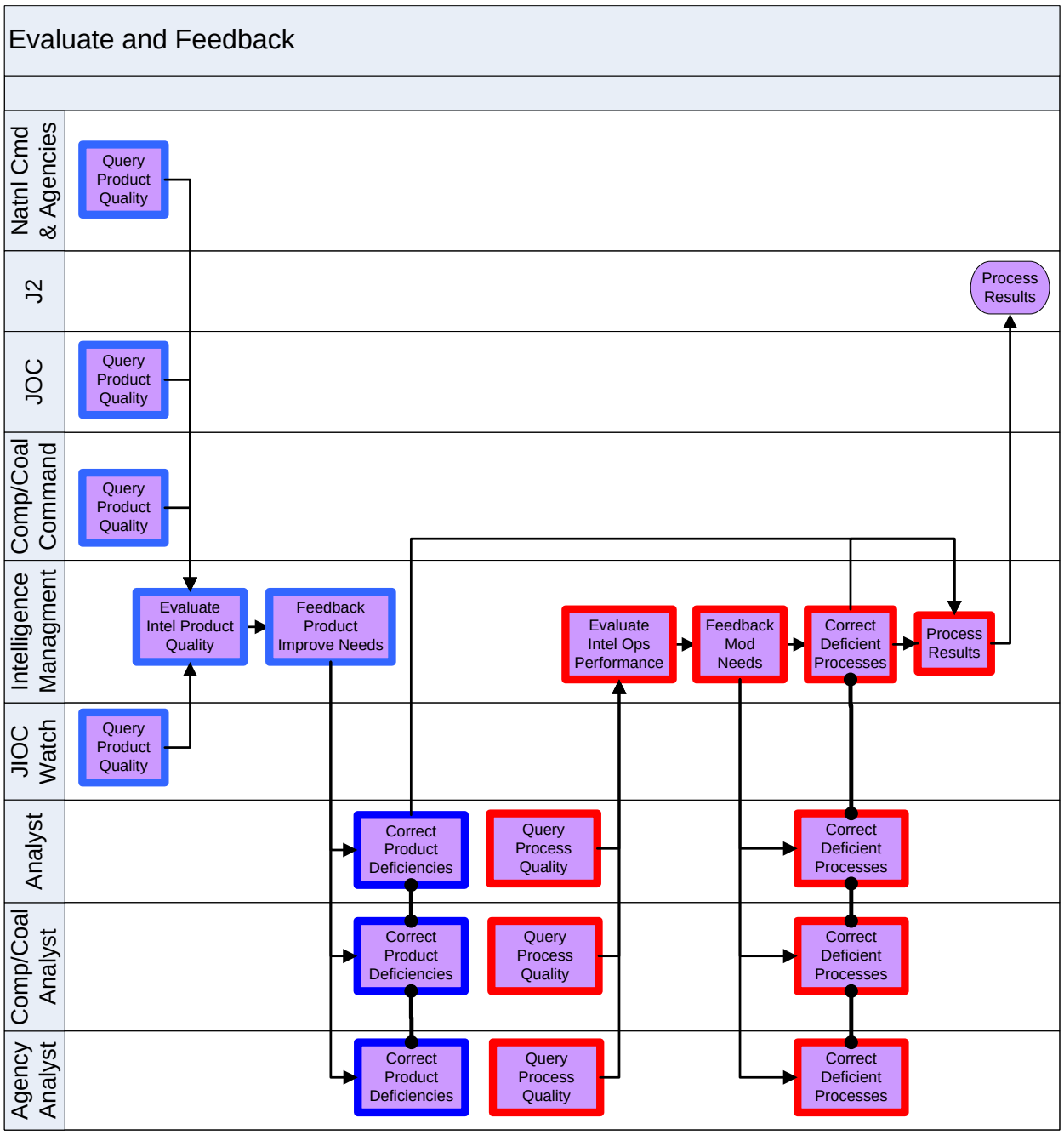


Figure 6.25 Evaluate and Feedback

7.0 JIOC CAPABILITIES EVALUATION

7.1 Capabilities Assessment Basics

The capabilities of an organization are determined by assessing how well it can execute its assigned tasks. The basic information contained in the BPM presented in this report is a list of the activities and tasks for which all JIOCs are responsible. Developing capabilities status when a large number of tasks are involved is complex. There is no "right" way to do this; it is mostly a matter of how those responsible for overseeing operations wish to have an assessment developed and presented. There is a hierarchy to how this can be done:

Produce a score for each task
Produce a score for each group of tasks (activity)
Produce a score for each high-level activity (the 6 in the Joint Pubs)
Produce an overall score for a JIOC

There are two ways to produce scores:

1. For each level in the progression numerically aggregate the scores from the contained activities/tasks. This produces roll-up scores.
2. For each level produce an independent assessment for the level as a whole. This is usually a subjective assessment by a subject-matter-expert (SME).

If roll-up scores are to be produced, two things are required:

1. A numerical scoring method for the lowest-level tasks to be considered
2. A numerical method for aggregating scores

The numerical score for the lowest-level tasks can be either subjective or objective.

Objective means are normally used for evaluating systems for which quantitative measures can be made, such as processing times.
Subjective opinions of SMEs are often used for human and group task performance.

The following section presents an example methodology for JIOC capabilities assessment.

7.2 Example Roll-Up Methodology

The following methodology is an example of what can be done. This is not a recommendation, rather examples of methods that have been successfully used.

The key to rolling up different types of results into an overall score is having all contributing results have a common scoring basis. This allows quantitative scores to be numerically combined, such as calculating an average. The methodology we introduce here is to reduce all results to a score on a

0-4 scale
0 = essentially no capability
4 = fully capable.

This is one of several possible methods. It is the example used here.

As one moves to higher-level results, such as for a major activity, producing numerical results from quantitative calculations become increasingly difficult. As one moves to higher levels more subjectivity is necessary.

7.2.1 Quantitative Results

Quantitative results are usually produced from data obtained from system logs. They can also be obtained from logs kept by observers or process executors themselves. For business processes the most frequently obtained data are:

a. Time to execute a task
b. Number of products (here, information products) that can be produced in a time period
c. Number of people needed to execute a task
d. Product (information produced) quality, e.g., number of errors or omissions

The data are not the results. Results are produced by a quantitative assessment, most often comparison of the results coming directly from the data to standards or thresholds. If there is no threshold, one is reduced to a subjective judgment of whether the result is good or not.

A decision must be made as to how the results fit on the 0 – 4 scale. This is done by numerical comparison to the threshold, such as 100% of the threshold being a 4, 80% a 3, etc.

7.2.2 Qualitative Results

Most of the information to be used for JIOC evaluation will be qualitative. For that reason the following description is more complete than was done for quantitative data.

Qualitative results come from judgments, preferably from SMEs, but also from participants in the processes. The qualitative information is produced from interviews or surveys. Referring to the data described in a in the former sub-section, appropriate survey questions would be:

Is the task executed in a timely manner?
Rate on a scale of 0 – 4 whether the task can be completed in a timely manner.

There is a tight relationship between the quantitative data to be obtained and the qualitative information to be gathered so that the two sets of results can be fused into a final result.

Descriptions of means used to process qualitative information for each task follow.

Step 1, qualitative data production:
1a. For each task provide one or more survey questions that address the quality of task execution.
1b. The questions should not be Y/N, rather should be answered on a 0 – 4 scale. An odd number of rating levels should be used, and a zero is useful to have available for those who wish to indicate “no capability”.
1c. Ideally, several SMEs should answer each question so that numerical results can be produced by averaging their scores.

Step 2, data processing, task score:
2a. Assign the number chosen on the scale by the SME as their numeric score for that question.
2b. Determine the average SME score.
2c. This produces the task-level scores that will be used in subsequent processing.

Step3, Task capability assessment:
If there are both quantitative and qualitative scores available for the task, choose a weighting for each and combine the scores. As noted above, for JIOC assessments there will normally be only qualitative results available.

Step4, Activity capability assessment:
4a. Choose the activities and/or tasks for which a capability score is desired.
The baseline tasks that are presented in Section 6 can be used.
The seven basic intelligence activities presented in the first OV-5 could be used for a high-level roll-up.
It is possible to roll-up to a single score for JIOC capability, but this is not very useful, and whether the results would be meaningful is questionable.
4b. Determine how many tasks will be included in the roll-up.
4c. One can only roll-up one level at a time. If roll-up to the seven basic activities is desired, three roll-up steps will be required 9one for each level below the top level.
4d. Add the scores for all of the tasks included in the roll-up and divide by the number of tasks. Task weighting can be used if desired.
4e. This produces the score for the chosen activity.
4f. Scores should not be produced to any more than two significant figures. The basic data are not accurate enough to warrant higher precision.

7.3 Capability Results Presentation

Stoplights and Dashboards: A numeric score is useful, but a visualization of the result is often more easy to interpret. Red, Yellow, Green stoplights are often used along with the numeric result. A dashboard with slider that represents the numeric score is often desired.

Histograms: Regardless of what type of visualization is used for a score, it is only a single number and may not well represent the results. For this reason it is useful to produce a histogram that shows the % of instances a given score is assigned. E.g. half of the scores being 0 and half being 4, is a far different result than all scores being 2, even though both produce the same numeric score. (This can be done at any level of roll-up.)

Cause and Effect: Results produced as noted above do not include the reason why a capability is at a particular level. Current status is the result of the interaction between
Systems
Processes
Organization
Human capabilities
If one wishes to be able to attribute capabilities status to a particular cause, or combination of causes, it is necessary to include specific questions that address cause in surveys. Some causal information can be obtained from quantitative data, such as a system having insufficient capacity

and this affecting task performance in a known way. Determining cause-and-effect at the task level can be done with sufficient planning, but is harder to do at the activity level because a larger number of factors is normally involved.

If one wishes, questions that address deficiencies/gaps can accompany capability scoring. Such results are not normally rolled up any further than indicating the number of times a particular reason is given.

Addressing Gaps: Addressing gaps involves both determining cause and proposing solutions. Determining cause and effect is covered immediately above. Gap solutions are readily apparent when cause is identified. If the solution requires a major change, possibly even a new program, having the gap solution associated with an architecture, such as is included with the BPM, satisfies a JCIDS requirement.

Appendix A: Distribution List

1.	Defense Technical Information Center 8725 John J. Kingman Rd., STE 0944 Ft. Belvoir, VA 22060-6218	1
2.	Dudley Knox Library, Code 013 Naval Postgraduate School Monterey, CA 93943-5100	1
3.	Research Office, Code 09 Naval Postgraduate School Monterey, CA 93943-5138	1
4.	Office of the Under Secretary of Defense for Intelligence Attn. Warfighter Support, Mr. Mark S. Chandler OUSD(I) Room 3D959 5000 Defense Pentagon Washington, DC 20301-5000	3
5.	Defense Intelligence Agency Attn. J262, Ms. Annette Redmond 7400 Defense Pentagon Washington, DC 20301	5
6.	Defense Intelligence Agency Attn. J262, Mr. David N Singley 7400 Defense Pentagon Washington, DC 20301	5
7.	Defense Intelligence Agency Attn. DIAC, Mr. Tony Barker, DSM (C4ISR) 200 MacDill Blvd Washington, DC 20340	4
8.	Defense Intelligence Agency Attn. Enterprise Management Office, Mr. James F. Harris Building 6000 Bolling Air Force Base Washington, DC 20340-5100	2
9.	JIOC Enterprise Architecture Steering Group Attn. James Wyche 8610 Explorer Drive Suite 200 Colorado Springs, CO. 80920	4
10.	Dr. Doug Mackinnon Information Sciences Department Naval Postgraduate School 1411 Cunningham Road, Glasgow West, Rm 3008 Monterey, CA 93943	1
11.	Dr. Gordon Schacher Information Sciences Department Naval Postgraduate School 777 Dyer Rd., Rm 100D	1

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